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Sessional papers.

SESSIONAL PAPERS.

VOL. XLII.—PART VII.

SECOND SESSION

OF THE

TWELFTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

SESSION 1910.

TORONTO:
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Entomological Society, Report	36	*Printed.*
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No. 2.... Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 28th January, 1909. *Not Printed.* Supplementary Estimates for the year 1909-10. Presented to the Legislature, 1st and 28th February, 1910. *Printed.* Estimates for the year ending 31st October, 1911. Presented to the Legislature, 7th March, 1910. *Printed.*

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No. 3..... Report of the Minister of Lands, Forests and Mines of the Province for the year 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

No. 4..... Report of the Bureau of Mines, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 5..... Report of the Inspector of Division Courts, for the year 1909. Presented to the Legislature, 8th February, 1910. *Printed.*

No. 6..... Report of the Inspector of Legal Offices, for the year 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 7..... Report of the Inspector of Registry Offices, for the year 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 8..... Report of the Provincial Municipal Auditor, for the year 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

No. 9.... Report of the Commissioners for the Queen Victoria Niagara Falls Park, for the year 1909. Presented to the Legislature, 4th March, 1910. *Printed.*

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No. 10.... Report of the Inspector of Insurance and Registrar of Friendly Societies for the year 1909. Presented to the Legislature, 18th February, 1910. *Printed.*

No. 11.... Financial Statements made by Loan Corporations, Building Societies, Loaning Land Companies and Trust Companies, for the year 1909. Presented to the Legislature, 18th February, 1910. *Printed.*

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No. 12.... Report of the Minister of Public Works, for the year 1909. Presented to the Legislature, 14th February, 1910. *Printed.*

No. 13.... Report of the Game and Fisheries Department, for the year 1909. Presented to the Legislature, 18th February, 1910. *Printed.*

No. 14.... Report on Highway Improvement in Ontario, for the year 1909. Presented to the Legislature, 14th February, 1910. *Printed.*

No. 15.... Report of the Bureau of Labour of Ontario, for the year 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

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No. 16.... Report of the Minister of Education, for the year 1909. Presented to the Legislature, 21st February, 1910. *Printed.*

No. 17.... Report of the Board of Governors of the University of Toronto, for the year ending 30th June, 1909. Presented to the Legislature, 27th January, 1910. *Printed.*

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No. 18.... Report of the Secretary and Registrar of Ontario, for the year 1909. Presented to the Legislature, 4th March, 1910. *Printed.*

No. 19.... Report of the Registrar-General, relating to the Registration of Births, Marriages and Deaths, for the year 1908. Presented to the Legislature, 21st February, 1910. *Printed.*

No. 20.... Report of the Provincial Board of Health, for the year 1909. Presented to the Legislature, 21st February, 1910. *Printed.*

No. 21.... Report upon the Hospitals for the Insane of Ontario, for the year ending 30th September, 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 22.... Report upon the Hospital for Idiots and Epileptics, for the year 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 23.... Report upon the Feeble-Minded in Ontario, for the year 1909. Presented to the Legislature, 9th March, 1910. *Printed.*

No. 24.... Report upon the Hospitals and Charities of Ontario, for the year ending 30th September, 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 25.... Report upon the Common Gaols, Prisons, and Reformatories of Ontario, for the year ending 30th September, 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

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No. 27.... Report upon the Operation of the Liquor License Acts in Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 28.... Report of the Department of Agriculture, for the year 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

No. 29.... Report of the Ontario Agricultural College and Experimental Farm, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 30.... Report of the Ontario Veterinary College, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 31.... Report of the Ontario Agricultural and Experimental Union, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

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No. 32.... Report of the Fruit Growers' Association of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 33.... Report of the Fruit Branch of the Department of Agriculture, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 34.... Report of the Ontario Vegetable Growers' Association, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 35.... Report of the Ontario Corn Growers for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 36.... Report of the Entomological Society of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 37.... Report of the Ontario Bee-Keepers' Association, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 38.... Report of the Dairymen's Associations of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

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No. 39.... Report of the Live Stock Associations of Ontario, for the year 1909. Presented to the Legislature, 4th February, 1910. *Printed.*

No. 40.... Report of the Farmers' Institutes of Ontario, for the year 1909. Presented to the Legislature, 4th February, 1910. *Printed.*

No. 41.... Report of the Women's Institutes of Ontario, for the year 1909. Presented to the Legislature, 4th February, 1910. *Printed.*

No. 42.... Report of the Poultry Institute of the Province of Ontario, for the year 1909. Presented to the Legislature, 4th February, 1910. *Printed.*

No. 43.... Report of the Agricultural Societies of Ontario, for the year 1909. Presented to the Legislature, 4th February, 1910. *Printed.*

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No. 44.... Report of the Horticultural Societies of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 45.... Report of the Bureau of Industries of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 46.... Report of the Inspectors of Factories of Ontario, for the year 1909. Presented to the Legislature, 10th March, 1910. *Printed.*

No. 47.... Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1909. Presented to the Legislature, 27th January, 1910. *Printed.*

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No. 48.... Return to an Order of the House of the Twenty-first day of February, 1910, for a Return shewing: (*a*) What is the area of the Gillies Limit. (*b*) How much of the area has been reported to the Government to be mineralized. (*c*) How much of the area has been prospected. (*d*) How much of the area has been sold. (*e*) What are the dates of the respective sales, the amount sold in each case, the names of the purchasers and the prices obtained in each case. Presented to the Legislature, 9th March, 1910. Mr. *McDougal*. *Not Printed.*

No. 49.... Report of the Ontario Railway and Municipal Board, for the year 1909. Presented to the Legislature, 1st February, 1910. *Printed.*

No. 50.... A Return from the Records of the General and Subsequent Elections to the Legislative Assembly on the 8th day of June. 1908, shewing:— (1) The number of Votes Polled for each Candidate in each Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of Votes Polled; (4) The number of Votes remaining unpolled; (5) The number of names on the Polling Lists; (6) The number of Ballot Papers sent out to each Polling Place; (7) The Used Ballot Papers: (8) The Unused Ballot Papers; (9) The Rejected Ballot Papers; (10) The Cancelled Ballot Papers; (11) The Declined Ballot Papers; (12) The Ballot Papers taken from Polling Places; (13) A General Summary of Votes cast in each Electoral District; (14) A similar statement as to any Elections held since the General Election. Presented to the Legislature, 26th January, 1910. *Printed.*

No. 51.... Report upon the Archives of the Province, for the year 1909. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 52.... Report of the Librarian on the state of the Library. Presented to the Legislature, 27th January, 1910. *Printed.*

No. 53.... Agreement and Contract with William Briggs, D.D., Book Steward of the Methodist Church, in connection with the Printing and Binding for the Legislative Assembly of Ontario. Presented to the Legislature, 26th January, 1910. *Printed.*

No. 54.... Agreement and Contract with E. H. Harcourt Company, Limited, in connection with the Binding, etc., for the Legislative Assembly of Ontario. Presented to the Legislature, 26th January, 1910. *Printed.*

No. 55.... Report of the Milk Commission appointed to enquire into the production, care and distribution of Milk. Presented to the Legislature, 21st February, 1910. *Printed*

No. 56.... Copies of Regulations and Orders in Council in the matter of Education, made pursuant to the provisions of 6 Edward VII., Cap. 52, Section 27, since the last Session of the Legislature. Presented to the Legislature, 27th January, 1910. *Not printed.*

No. 57.... Statement of the Auditor made pursuant to the provisions of Section 13, Sub-section 2, of the Audit Act as amended by Section 6, Chapter 10, 9 Edward VII. Presented to the Legislature, 27th January, 1910. *Printed.*

No. 58.... Return to an Order of the House of the Thirtieth day of March, 1909, for a Return shewing, during the past twelve months all permits to effect insurance in foreign unregistered Corporations, Insurers or Underwriters issued by the Insurance Registrar, under Section 86a of the Ontario Insurance Act, as amended by 2 Edward VII., Cap. 12, and 4 Edward VII., Cap. 15, and of all letters and applications in respect of which such permits were issued. Presented to the Legislature, 27th January, 1910. Mr. *Proudfoot. Not printed.*

No. 59.... Copies of Orders in Council in accordance with the provisions of Subsection 2 of Section 84 of the Surrogate Courts Acts, and Subsection 4 of Section 164 of the Land Titles Act. Presented to the Legislature, 3rd February, 1910. *Not printed.*

No. 60.... The Province of Ontario, Situation and Size, Climate, Products, Resources, Progress and Advantages. Presented to the Legislature, 4th February, 1910. *Printed for distribution only.*

No. 61.... Copy of an Order in Council under Sub-section 2 of Section 84 of the Surrogate Courts Act, authorizing payment of surplus surrogate fees to His Honour Judge Wismer, Junior Judge of the County Court of the County of Simcoe. Presented to the Legislature, 7th February, 1910. *Not printed.*

No. 62.... Return to an Order of the House of the Twenty-eighth day of January, 1910, for a Return: 1. Shewing the number of Licenses Granted to Fishermen in each of the following Districts in the years 1908 and 1909; (*a*) Lake Superior. (*b*) The Northern Channel of Lake Huron. (*c*) Georgian Bay. (*d*) Lake Huron and Lake St. Clair. (*e*) Lake Erie and Grand River. (*f*) Rivers St. Clair, Thames

and Detroit, and (*g*) Lake Ontario and Bay of Quinte. 2. The kind of License Granted to each Fisherman. 3. The cost of Licenses to each Fisherman of each of the above Districts. Presented to the Legislature, 7th February, 1910. Mr. *Proudfoot. Not printed.*

No. 63.... Rules and Regulations made by order of His Honour the Lieutenant-Governor in Council, for the carrying into effect the Succession Duty Act. Presented to the Legislature, 14th February, 1910. *Printed for distribution only.*

No. 64. .. Statement on the distribution of the Revised and Sessional Statutes, up to 31st December, 1909. Presented to the Legislature, 14th February, 1910. *Not printed.*

No. 65.... Return of an Order of the House of the Seventh day of February, 1910, for a Return shewing: 1. A copy of the advertisement calling for tenders for the printing, publishing and supply of "Ontario Readers"; 2. Copies of all tenders received; 3. Copies of correspondence between the Government of Ontario or any official thereof and any tenderer or tenderers; 4. A copy of the contract entered into on behalf of the Government for the printing, publishing and supplying of "Ontario Readers"; 5. A detailed statement of the cost to the Government of supplying to the publisher electro-plates for each reader. Presented to the Legislature, 28th February, 1910. Mr. *MacKay (Grey). Not printed.*

No. 66.... Report upon Infant Mortality in the Province. Presented to the Legislature, 8th March, 1910. *Printed.*

No. 67.... Return to an Order of the House of the Sixteenth day of February, 1910, for a Return shewing: 1. The number of male teachers granted County Model School Certificates in the years 1906, 1907, 1908 and 1909, respectively. 2. The number of female teachers granted County Model School Certificates in the years 1906, 1907, 1908 and 1909, respectively. 3. The number of male teachers granted Normal School Certificates in the years 1906, 1907, 1908 and 1909, respectively. 4. The number of female teachers granted Normal School Certificates in the years 1906, 1907, 1908 and 1909, respectively. Presented to the Legislature, 8th March, 1910. Mr. *MacKay (Grey). Not printed.*

No. 68.... Return of an Order of the House of the Fourth day of March, 1910, for a Return of Copies of the Reports relating to the cause of the fire in the Parliament Buildings. Presented to the Legislature, 9th March, 1910. Mr. *Elliott. Not printed.*

No. 69.... Return to an Order of the House, of the Twenty-second February, 1910, for a Return shewing: All awards by any Arbitrator or Board of Arbitration, to settle disputes between the Hydro-Electric Power Commission and those over whose lands the Commission have taken easements. Presented to the Legislature, 10th March, 1910. Mr. *Reed (Wentworth.) Not printed.*

No. 70.... Return to an Order of the House, of the Twenty-fifth day of February, 1910, for a Return shewing: The total amount paid for inspection

and overseeing work done on building Colonization Roads during the years 1908 and 1909. Presented to the Legislature, 10th March, 1910. Mr. *Proudfoot. Not printed.*

No. 71.... Return to an Order of the House, of the Twenty-fifth day of February, 1910, for a Return shewing: 1. The amount of Provincial Money (if any) loaned to Municipalities of the Province for Drainage purposes during each of the years 1904 to 1909, both inclusive. 2. The names of the Municipalities and the amount loaned to each in each of the said years. 3. The rate of interest charged the Municipalities, if other than four per cent. 4. The Special Grants (if any) given to Municipalities for Drainage Schemes during the said years, the names of the Municipalities to which given, and the amount given each. Presented to the Legislature, 10th March, 1910. Mr. *Stock. Not printed.*

No. 72.... Return to an Order of the House, of the Sixteenth day of February, 1910, for a Return shewing the number of permits and extensions granted to Public School Teachers during the years 1908 and 1909: 1. The reason for granting such permits and extensions. 2. How many of the teachers who received permits had previously taught. 3. The ages of the teachers who received such permits and extensions. Presented to the Legislature, 10th March, 1910. Mr. *Proudfoot. Not printed.*

No. 73.... Return to an Order of the House, of the Third day of March, 1910, for a Return shewing what steps (if any) the Canadian Northern Ontario Railway Company has taken towards the building of a section of the Railway into the clay belt of Northern Ontario in aid of which this House voted to the Company at its last Session a subsidy of four thousand acres of land for every mile of the Railway which may be constructed by the Company on certain conditions, among others that operations be commenced within one year from the date of the passing of the Act, April 13th, 1909. Presented to the Legislature, 10th March, 1910. Mr. *Johnson. Not printed.*

No. 74.... Report of the Bureau of Colonization, for the year 1909. Presented to the Legislature, 14th March, 1910. *Printed.*

No. 75.... Return to an Order of the House of the Twenty-fourth day of February, 1910, for a Return shewing: 1. The names of the gentlemen who compose the Commission for the Revision of the Statutes. 2. The total cost of the Revision to date, showing in detail, the persons to whom and on what account the money was paid. 3. When will the Statutes be completed. 4. What steps have the Government taken to induce or insist on the Commissioners completing their work at an early date. Presented to the Legislature, 15th March, 1910. Mr. *Proudfoot. Not printed.*

No. 76.... Return to an Order of the House of the Twenty-fifth day of February, 1910, for a Return shewing: 1. When was the resignation of the late Game Warden, T. A. Hand, accepted. Was it voluntary, or was he forced to resign. 2. What moneys had been collected by the said Hand and not accounted for or returned, and if Fishermen had fished and Hunters had hunted on receipts only given by the said Hand. If so, the amount of money unaccounted for and the number

of such receipts given and to whom, together with copies of all correspondence covering the matters referred to in this clause. 3. All correspondence in connection with the resignation of the said Hand. 4. All moneys collected by the said Hand during the years 1907 and 1908 and of all moneys collected by the present officer, A. Calbeck, during the year 1909, together with the names of the persons from whom the said collections were made. Presented to the Legislature, 15th March, 1910. Mr. *Proudfoot. Not printed.*

No. 77.... Return to an Order of the House of the Thirtieth day of March, 1909, for a Return shewing: 1. How often had the present Government been asked for permission to institute an action in cases where a fiat was necessary. 2. How often had such permission been granted. 3. In what cases. 4. How often was such permission refused. 5. In what cases. Presented to the Legislature, 15th March, 1910. Mr. *Elliott. Not printed.*

No. 78.... Return to an Order of the House of the Twenty-fifth of February, 1910, for a Return shewing: 1. How many Emigrants the Salvation Army brought out from Great Britain and Ireland during the season 1909. How many were male and how many female. 3. How many were placed in the homes of the farmers of the Province of Ontario. 4. The names and addresses of the farmers. Also shewing: 1. How many Emigrants the Government of this Province brought out from Great Britain and Ireland during the season of 1909. 2. How many male and how many female. 3. How many were placed in the homes of the farmers of the Province of Ontario. 4. The names and addresses of the farmers. Presented to the Legislature, 16th March, 1910. Mr. *Studholme. Not printed.*

Seventeenth Report

Neglected and Dependent Children of Ontario

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY

Parliament Buildings, Toronto.

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1910

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WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO

As received.

Saving the waste product.

A month later.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D.,

Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to transmit herewith the Seventeenth Annual Report of the Department of Neglected and Dependent Children of Ontario for the year ending December 31st, 1909.

Respectfully submitted,

W. J. HANNA,

Provincial Secretary.

PARLIAMENT BUILDINGS,

TORONTO, FEBRUARY 28, 1910

OFFICE OF THE

SUPERINTENDENT OF NEGLECTED AND DEPENDENT CHILDREN OF ONTARIO.

The Honourable W. J. HANNA,

Provincial Secretary.

SIR,—I beg to submit herewith the Seventeenth Annual Report of the work of this office, under the Children's Protection Act of Ontario, being for the year ending December 31st, 1909; also Reports on the Industrial Schools of the Province, and Juvenile Immigration.

I have the honour to be, Sir,

Your obedient servant,

J. J. KELSO,

Superintendent.

PARLIAMENT BUILDINGS,

TORONTO, FEBRUARY 26, 1910.

ONTARIO

NEGLECTED DEPENDENT CHILDREN

SEVENTEENTH ANNUAL REPORT.

TORONTO, February 26, 1910.

WHEN one is exceedingly busy with the routine things of daily life, and small events calling for a great variety of thought and action crowd upon each other in endless succession, the Making of an Annual Report creates a pause and forces a review and stock-taking that, however burdensome, can hardly fail to be beneficial. What are we doing? whither do our efforts tend? are we right? is good being accomplished? are questions that call for consideration and reply.

This is now the Seventeenth Annual Report issued on the work for Neglected and Dependent Children in Ontario, and some effort will be made in it to fairly review the activities of the year, and deal not only with what has been done but with what has been left undone.

While endeavouring to protect every child in this Province from neglect, cruelty and hurtful training, and removing them, where necessary, to more favourable environment, the experience of many years leads inevitably to the belief that to secure the most satisfactory and permanent results, the child must be considered as an integral part of the family, and all be helped together. There will always be much to do in the way of picking up and caring for the stray child here and there, and it is a painful necessity at times to break up the family, but, as a general rule, and as a foundation principle in the work, the true friend of the children will go much farther back than the actual case of "neglect" and seek for the removal of those causes that lead to desertion, indifference, vicious living and crime. It is a rare case where parents do not love their children and children love their parents. Deep in every heart is implanted this strongest and most enduring of all human affections, manifesting itself in earliest infancy, and following closely through all the vicissitudes of life to the border of the grave. When one has to meet frequently the heart-broken mothers whose children have gone astray and got into reformatories and prisons through social maladjustment beyond their control, and has studied erring and dependent children and marked the grief and despair that settles like a pall upon their inner life as they realize what it is to be

without home or kindred, one turns with hope and effort to the realization of an ideal condition when some at least of these great abuses may be remedied and the home life kept free from destructive influences.

It was with these thoughts in mind that the work was carried on during the past year, and more and more has time and thought been given to an educational propaganda. Some of the matters that have been considered and discussed in various ways have been the following: The abolition of promiscuous charity with a view to the elimination of pauperism; the interesting of the great organizations of the country, such as the municipality, the church, the police force and business men in the modern conception of social service; the wiping out of slums; the providing of a better type of working men's homes with sanitary conveniences: the closing of alleys and by-ways where the poor are deprived of proper living space; the establishment of numerous small supervised playgrounds; the medical and dental inspection of children; more practical instruction in public schools, having in view the vocation in life of the pupil; suppression of child labour and at the same time, the inauguration of an apprenticeship system and the requiring of children over school age to learn some trade or useful industry.

Much has been done through literature and addresses to get this great work established on right principles. In the past there has been inefficiency and carelessness in the management of charitable enterprises, because of the indifference of business men and leaders of public thought. To an appalling degree money and effort have been wasted through lack of organization and the failure to employ competent people to initiate and supervise social relief. Haphazard and superficial are mild terms to use, but recent years have seen much progress toward a better order of things. As our contribution toward social reform, over twenty thousand copies of reports, pamphlets and leaflets have been sent out from this office during the year, and since the work started over half a million copies have been distributed broadcast. Many addresses, newspaper and magazine articles have also helped materially to interest the community in social reform and child-protective work. There can be no service without knowledge. Personal interest must be aroused, and when this is accomplished in every city, town and village or farm home, the need for active interference on behalf of children is reduced to a minimum.

Carried on with Economy.

It is important to know also that the work of the children's branch of the public service is carried on at very low cost. Since its inauguration seventeen years ago, the average expense to the Province has been about $14,000 per annum, starting at $4,000 and gradually increasing to $17,000. No philanthropic undertaking of the same magnitude anywhere is financed more economically. An additional expenditure of about $25,000, made up of municipal grants and charitable contributions, would probably represent the entire annual cost of the Children's Aid work in Ontario! The explanation is that the work is not bureaucratic—it is the aggregate volunteer service given to children by the people generally that has made so much work possible at so small an outlay.

Larger expenditure would be fully warranted, for additional agents are badly needed to carry out the intention and spirit of the act in the different sections of the Province.

A Limitation in the Work.

As is well known to readers of these reports, a great deal of the work carried on in past years has been of a personal character and, to a considerable extent, outside the provisions of the Act. Wherever aid or assistance could be given there was no hesitation in doing whatever was necessary, whether the person in need was a child or an adult. Much of the success of the Children's Aid movement in earlier years was due to this willingness to be of service, and the greatest success has often been met with in dealing with matters that did not come definitely within the provisions of the Children's Act. This special work is no longer possible, as the Audit Department has decided to require all the work done to be strictly within the terms of the Act where expenditure is involved. An explanation is made in order that friends may understand that in future all cases that cannot come strictly within the meaning of the law must be referred to other societies and institutions.

No Philanthropic Work so Hopeful.

There is no Christian philanthropy more practical or hopeful in its results than the work of helping and protecting young children. Many of those helped in the earlier years have grown to manhood and womanhood and are now showing by useful and industrious lives that they have nobly responded to the efforts made on their behalf.

The aim of this movement is to get good people interested everywhere in the work of befriending young people, as the personal touch and the individual interest is the influence that awakens the dormant ambition to excel. There are at the present time sixty-two Children's Aid Societies, and it is impossible to estimate all the good work that is done through these organizations. It is safe to say that at least thirty or forty thousand children have come in one way or another under the beneficent influence of the Society, and the home conditions so improved that they were enabled to grow up in natural surroundings, free from the neglect, abuse and wretchedness that formerly prevailed.

The main object of the Children's Aid Society is not to take children from their parents, but by kindly effort and, if necessary, legal action, to bring about sobriety, cleanliness and moral living for the sake of the children. But there are occasions when these efforts are of no avail and the children have to be removed for the sake of their own future and for the protection of society. Some five thousand five hundred children have been received under the Societies' guardianship from the lowest possible surroundings and transferred to foster-homes, and less than two per cent. of these children have gone back to the conditions from which they were rescued.

As showing the need for continued activity in rescuing such children a family might be mentioned in which both parents, two sisters and a brother were all in penal institutions for various crimes, and the Society had been asked to take the younger children so that they might not grow up in the same way. There are

many such families scattered through the country where drastic measures are necessary in order to stop crime and degeneracy from being perpetuated.

Through the practical work of these Societies in the past not only have many young lives been bettered, but thousands and thousands of dollars have been saved to the country in the lives diverted from careers of idleness and crime.

Efforts have been made to encourage each person in the Province to do a little for the help and encouragement of some particular child. As an instance of of this the following case might be mentioned: A boy in a town some distance away was about to be committed to a reformatory. An agent of the Society was sent to intervene, with the result that the magistrate became the boy's friend, a situation was procured and by good conduct since that time the lad had shown a generous response to the friendly interest taken in him. Was this not much better than hopelessly sending a bright, attractive lad to a reformatory with a stigma on his name and a danger of his becoming hardened and indifferent because of the unjust treatment accorded him? There are many bright, interesting and attractive boys sent to prison for breaches of the law who might have become useful and noble men had they been patiently, sympathetically and lovingly dealt with at the critical time.

There should be more practical social service work taken up in our churches and benevolent organizations, for a timely word and personal interest would save many a wavering lad. Then there should be plenty of social centres and playgrounds scattered through every city under the direction of athletic young men and women who would sympathise with the children and help them to thoroughly enjoy the all too brief period of childhood. It is only by friendly, intelligent, individual and organized effort for the safeguarding of the rights of children that we can hope to advance the happiness and real prosperity of the country at large.

Steady Advance in the Work.

Each year sees the work of child-saving taken up more thoroughly in Ontario, and many cases that formerly were allowed to pass unnoticed are now vigorously dealt with and parties who offend against child-life are sent to prison. The need for local agents has impressed itself strongly during the year. No matter how many good people and societies we may have, unless there is some particular person devoting all his time to the carrying out of the Society's objects very little progress can be made. To a large extent THE AGENT IS THE SOCIETY and it is always where an efficient agent is appointed that the best results can be counted upon. Among the men who have had great influence in this respect might be mentioned the late Mr. S. M. Thomson, Mr. John Keane, of Ottawa; Mr. Joseph Sanders, of London; Rev. C. R. Miller, of Berlin; Rev. Hugh Ferguson, of Stratford; Mr. W. H. Wrightmyer, of Belleville; Rev. Amos Tovell, of Guelph; Mr. Charles Black, of Niagara Falls; Mr. John Wilkinson, of Sarnia; Rev. P. C. L. Harris, now of the Humane Society, Toronto, and Rev. W. A. Gunton, formerly executive officer at Chatham, but more recently doing some missionary work throughout the Province. These men give all their time to the children's cause and they accomplish a definite and practical work that could not easily be put on paper. In some other places we

have men and women who, although not directly employed in the work, give largely of their spare time and deserve the grateful recognition and appreciation of all who love children.

It may seem a large undertaking to provide an agent in every county, and yet it is difficult to see how we can hope for much advance without this. Cases of neglect and ill-treatment of children are far more numerous than the public generally imagine. Where there is no active work carried on they escape notice, but where there is a real attempt to do the work thoroughly many shocking cases are brought to light. The Children's Aid Act has never yet had a fair trial, for if one-quarter the money were spent in the prevention of crime and misery that is spent in taking care of the finished product there would soon be a diminution noticeable in the number of those requiring custodial care and imprisonment. As has often been pointed out, preventive work will never appeal to the public imagination with the same force as the reformative branch since the one is unseen and unnoticed, while the other is quite evident and makes a strong appeal to sympathy. Nevertheless, the preventive side of the work is the one that should always be given first place.

HOME-FINDING.

This is a most important branch of the work of Children's Aid Societies. After the rescue of children from evil and immoral surroundings their placement in good homes becomes necessary.

The importance of this work becomes more apparent when it is understood that seven-eighths of the children placed by Children's Aid Societies go to country homes. It is in the fullest sense an exemplification of the "Back to the Land" movement which is being urged and commended by all who have at heart the best interests of their fellow Canadians.

Most of the children taken in charge by Children's Aid Societies are from cities, but quite a large proportion are from country districts, especially from the unorganized districts of New Ontario, where social and educational advantages have been lacking and where in addition have drifted a number of shiftless characters who apparently expected that laws would not be so strictly enforced there as in the older settled localities. Then there are many children from the country who are brought to large cities because of the existence of institutions. In placing these children again in the country it is only giving back to it that which was already its own. The placing of city children in country homes is also a repayment, though in a very small degree, for the thousands of children who are leaving the farms of Ontario for the cities. The scarcity of farm help is becoming so acute that many farmers are not working so much land as they did formerly and others are removing with their families into the cities. To alleviate this condition of affairs, as is most surely being done by the placement of several hundreds of children each year in farm homes, is a commendable work. The children are not, however, being placed with the intention of helping the farmer. The primary object in view is to help the children, and this can be done most effectively by placing them in country homes, where they are away from the distractions and temptations of city life.

For the past few years the average number of placements was 350, and, though this number was materially increased last year, there is yet room for improvement. The Children's Aid Societies, which are organized in towns where there are orphanages, might very well turn their attention to assisting in finding homes for these orphanage children and give them the advantage of being reared under ordinary conditions in a family home. There they have room for the display of originality and their self-reliance is developed. In an orphanage or other institution, children are necessarily taught to do everything according to rule and in unison. This is apt to take all the individuality out of them and make of them mere machines. The question of the expense for maintenance of the orphanages of Ontario, though a minor one, is sufficiently important to receive consideration. In 1908 this expense was in round figures $160,000. To materially reduce these figures and at the same time improve the prospects of the children is a worthy ambition. The following figures show the number of children placed in 1909:

From
Wretchedness
to
Comfort.

Total number of children placed for first time, 605; of this number 468 were Protestant and 137 Catholic.

Placed by Societies, 308 Protestant and 97 Catholic children. Placed through the Provincial office, 155 Protestant and 40 Catholic children.

In addition to this, 340 children placed in former years were returned and replaced in other homes and situations.

The principal Societies placing children were Ottawa, 81; Berlin (Mr. Miller), 73; Belleville, 34; Toronto, 30; Guelph 29; Hamilton, 19; Stratford, 14; Sarnia, 12; Chatham, 11; and Owen Sound, 8.

Other Societies placed from two to six children, possibly considerably more, but returns were not sent in.

These figures are creditable, with the exception perhaps of Toronto, where the Shelter is overcrowded and over 1,300 children in public institutions. The Society and the civic authorities might well take this matter up and plan a special home-finding campaign.

Sex.—Of those placed by Societies, 220 were girls and 185 boys: by Central office, 94 boys and 66 girls.

Age.—The age of children placed by Societies were: 62 under three years; 180 between three and ten; 112 from ten to fourteen; and 51 over fourteen.

How Homes are Obtained.

The best homes have to be sought out—not waited for. Like every other successful business, special advertising has to be done and the customer shown the goods to advantage. Children in bulk, with the institution trade-mark on, are not attractive. There is too much of a sameness—they look stupid and say "Yes, ma'am," when they should say "Yes, sir," and when exhibited in a row the picking and choosing becomes almost repulsive; and not infrequently the hungry-hearted seeker goes away in disgust. Sometimes the poor child would have a better chance to find a home if left on the roadside to plead its own cause. Too often the institution is the barrier that shuts the child away from the opportunities, the privileges and the blessings of a real home with mother-love and sympathy and protection. Children wanting homes should be daintily dressed and encouraged to think and act naturally; they should never be exhibited to the applicant in companies, and if it could be arranged the meeting should take place in a private house, or at least in the parlor or living room of the matron. A good plan is to draft them off in twos and threes to the county towns, where there are Children's Aid workers only too willing to help in getting them good homes. In the big city institution they have no chance, only the pretty and the bright are wanted, but in the country there are plenty of good souls ready and anxious to mother even the plainest.

A Successful Experiment.

Here is a boy of ten, whose story is an exemplification of the advantage of placing dependent children in good family homes: He was received from an orphanage where he had been for years, and was likely to remain for years because of his dullness and unattractive appearance, and was sent on trial to foster-parents who

had never seen him. Some months later the visitor went to report on his progress and met him on his way to school. The fact that he was a boy and homeless had enlisted the sympathy and affection of his foster-parents, and he is receiving the individual care and training that is so necessary for just such a boy. The doctrine of evolution—the survival of the fittest and the weaker "goes to the wall"—is probably correct in its larger sense, but fitness and unfitness is helped and hindered as much by education and surroundings as by natural attainments. Among a number of handsome, intelligent children this unattractive, awkward, dull boy had poor prospects, but as "the only boy" he is made to believe he is of some importance. His self-reliance is developed because he is encouraged to have a good opinion of himself on account of receiving the entire attention of his foster-parents. This case is an apt illustration of the difference between competition and monopoly. This child has a monopoly of the affection of his foster-parents. If he had to compete for their affection with a number of other children better equipped mentally and physically than he, it is unlikely that he would receive sufficient to benefit him to the degree that he is benefitting at present. In the light of this experience it is satisfactory to know that there is, practically, a home for every homeless child in Ontario.

Visiting and Supervising Children.

No greater responsibility could be placed upon anyone than the duty of supervising and protecting the interests of several thousand children placed out in foster-homes in all parts of the country. This has always been a heavy burden and one that bears down upon the mind with increasing weight as the years go by. Every effort is made to secure satisfactory homes for the children who are left homeless, and, while there are occasional mistakes made, it is really remarkable how uniformly satisfactory this work has been. The great majority of the children are in the hands of reliable people who treat them with every consideration and often show an interest and a patience that could hardly have been expected. The visitors, without exception, have expressed their surprise to find the children so comfortable and so well treated, and it is only in a rare case that removal is recommended. It is interesting to note here that while the work of visiting the children was originally carried on by Mrs. Harvie, it has gradually grown so large as to require the services of many. In order to remove as much as possible the official aspect, a number of Children's Aid agents in different parts of the country have been deputed to act, and not only is the work well accomplished in this way but there is the additional interest and experience gained by local workers, who in turn impart the result of their observations to local Societies and create a more widespread interest. Between three and four thousand children have been visited during the year and written reports sent to this office concerning their progress and welfare. In addition many letters have been sent to children and foster-parents to keep up the personal element and to encourage and inspire to worthy living.

The beneficial results of this work are far beyond computation and all who have the interests of the children at heart can rest assured that no reasonable effort is spared to have this branch of the work carried on with the highest degree of efficiency. We are always learning and endeavouring to improve our methods and no suggestion that seems to indicate advance is lightly thrown aside.

Mrs. Harvie is no longer able to do outside visiting but has given valuable assistance in taking charge of records and preparing and revising lists of children for the various agents engaged in the work of visiting. She has been a great help in the past and it is a pleasure to know that she is still in a position to continue her good work.

Children Enjoy Good Health.

The remarkable health of children sent to foster-homes is again worthy of notice. Notwithstanding the large numbers that are placed out—over 5,000 in

From Institution to Foster-Home.

The printing of this picture in a leading newspaper opened the doorway of twenty homes to friendless children.

round figures—not more than two deaths have been recorded during the year, the chief reason for this immunity probably being the healthy, open-air life of the country which the children enjoy.

Getting Settled in Life.

Then it is interesting to note also that young people are continually becoming of age and going off to do for themselves, quite a number having married and

started in homes of their own, gradually merging quietly and imperceptibly into the general life of the community. Some few of these older children come back occasionally to tell us of their progress, but as a rule they prefer to forget the past and to conceal the facts relating to their early history. In this work it is not well to look for gratitude or appreciation from those who have been helped, otherwise there would be many disappointments. Only on rare occasions one hears from the lips of a young person words of thanks or gratitude, but in other ways there are many evidences of the success of right effort both in the lives of the children and in the general welfare of the community.

WORK FOR CATHOLIC CHILDREN.

It is a great pleasure to record the fact that during the past seventeen years the Children's Aid movement has had no better friend than the present Catholic Archbishop of Toronto. When the Hamilton Society was organized, the Archbishop—then Rev. Father McEvay, Rector of St. Mary's Cathedral—occupied a seat on the platform and expressed his great interest in the proposed society. He afterwards became Bishop of London, and while occupying that office encouraged the rapid placing of orphanage children in family homes, and did much to advance the spirit of friendly co-operation. On his elevation to the high office of Archbishop of Toronto, I had the pleasure of an audience and the promise of his continued support and assistance whenever possible. He also kindly wrote the following letter:

St. John's Grove, 510 Sherbourne Street,

Toronto, August 21st, 1909.

Mr. J. J. Kelso,

Superintendent of Children's Aid Societies, Toronto.

Dear Sir,—I have followed the workings of the Children's Aid Societies from the beginning, in several places, and have been much pleased with the results.

The fair play shown to Catholic children and to the Catholic institutions and the appointment of a special Catholic Officer to look after the Catholic children and the guardians, have given confidence to all concerned that no effort has been made to rob the little ones of their faith. On the contrary, everything is done to give them a chance to preserve it.

You may remember that I mentioned to you a difficulty which arises at times in the placing of young children. It is when parents wish to force the institutions to keep the children until they are able to work, then take them home and compel them to work while they spend the children's wages in drinking. The younger children are placed in good homes, the better for them. But neither institutions or guardians desire to have threats and lawsuits and trouble made for them by worthless parents, and hence every reasonable protection should be given to those guarding the rights and interests of children.

Congratulating you on your long and successful career in the difficult position of Superintendent, and assuring you also of the appreciation of the good work done by your assistant, Mr. O'Connor, I am,

Yours sincerely,

F. P. McEvay.

Archbishop of Toronto.

Mr. O'Connor's Report.

The special work of supervising and protecting the interests of Roman Catholic children continues to be performed in a most satisfactory manner by Mr. William O'Connor. Following is his report:—

During the year 137 children were placed in foster-homes under the supervision of the Children's Aid Societies of the Province. This is a considerable increase over the figures given for the years 1907 and 1908; these being, respectively, 80 and 87. However, this increase is more apparent than real, as during the past year 46 children taken in charge by Children's Aid Societies were placed with their parents on the regular agreement for adopting children. Of the 41 children placed for the first time by the Ottawa Society, 35 were placed in this way. This is a new departure, because hitherto children have not been taken from their parents unless repeated warnings and trials have proven that their homes were not fit places for them to remain in, and then it was only under exceptional circumstances that they were adopted to their own parents. Another cause for the large number of placements was that 32 of those placed were from the St. John's Industrial School. The Societies placing these children were: Ottawa, 41; St. Vincent de Paul, 8; Sault Ste. Marie, 9; Guelph, 9; Walkerton, 6; Sudbury, 5; North Bay, 7; Hamilton, 4; Provincial Office, 40; Stratford, 2; and 1 each by Belleville, Brockville, Berlin, Peterborough, Parry Sound and St. Mary's School.

The ages were: Under two years, 4; two to eight years, 35; eight to twelve years, 35; twelve to sixteen years, 45; over sixteen years, 18.

These figures show that the number of children placed out for the first time who were under twelve years of age was 74, or 54 per cent. of the total number placed. There was a good number placed over twelve and over sixteen years of age, and this was caused in part by the placement of the Industrial School boys. It is an axiom among those engaged in the placing out of children that the younger they are placed in foster-homes the more likely they are to remain contented in their homes, to prove satisfactory to their foster-parents, and to become respectable citizens.

The parentage of the children placed in foster-homes was as follows: Father living, 25; mother living, 21; both parents living, 70; both parents dead, 10; illegitimate, 6; information not given, 5. It is a singular fact in connection with the parentage of these children that so large a number have both parents living and so small a number have both parents dead. This same fact is said to exist in regard to the parentage of children in orphanages. That is so few of them are really orphans in the sense of both parents being dead.

During the year 1909, 25 children were returned from their foster-homes as unsatisfactory, 8 were removed because of unfair treatment, 24 left their homes without permission, 31 were replaced in other homes, 46 were adopted to their own parents and 11 were allowed to return to their own homes after spending some time in a foster-home, none died, and 1 was married.

Divided according to sex, the children taken in charge by Children's Aid Societies during the year were: male, 88; female, 49.

In addition to these, 30 children were placed in family homes from the Catholic orphanages of Ontario. Divided as follows: Sacred Heart Orphanage,

Toronto, 15; St. Mary's Orphanage, Hamilton, 8; Mount St. Joseph Orphanage, London, 7. Most of the children placed by the Toronto institution were placed directly through this office. All these children are visited as opportunity offers and their welfare looked after by the Provincial Office.

The necessity of regular visitation of children in their foster-homes becomes more and more apparent as the years go on. The children look forward to these visits eagerly as the coming of a friend whose advocacy of their interests is genuine and undivided. It is very pleasant to realize the change that often takes place in the attitude of some boys who in the beginning view the Inspector with frank disfavor. It is necessary to deal firmly with these boys and to, sometimes, show them the power of compulsion exists; but when they understand that the compulsion is used for their benefit and that they are only forced to do what is thought to be in their interests, they then show a lively feeling of gratitude. Boys of fourteen to eighteen years of age have more sentiment in their composition than they are usually given credit for, though they do not show it so readily as their sisters, and if you can gain a boy's respect and confidence you can do a good deal with him. The foster-parents, in the majority of cases, welcome the coming of the visitor as an assistant who will help in straightening out any little tangles or difficulties that have arisen, and having the confidence of both he is well qualified to act as arbitrator in settling these difficulties. In a few instances where the children have been taken quite young and are being reared as members of the family, bearing the family name, etc., it is necessary to be cautious and circumspect in making these visits; but even here it is wise to maintain a certain amount of supervision.

During the past ten years a large number of children have been returned from foster-homes where, in the first instance, it was thought they would remain for life. But conditions have changed. The breadwinner of the family has died, or the one who took the most interest in the child has died, and the little one is returned for another home to be found. The child has received the benefit of good care and training, has been well clothed and fed for a certain length of time, and is now stronger and better equipped for the next home to which he is sent. It is a good thing, however, that there is an organization ready to receive the child back and look after its future interests.

During the year, about 575 children were visited and 5,500 miles of railway was travelled in doing the work.

Death of S. M. Thomson.

When the Children's Aid Society of Brantford was organized in 1894, Mr. S. M. Thomson was elected Secretary, and his zeal and enthusiasm in the children's cause seemed to grow keener each year up to the hour of his sudden death on January 4th, 1910. So great was his love of the work that he felt constrained to give up his business and preach the gospel of child-saving throughout the Province, and for a number of years past he gave valuable aid in creating and sustaining interest in the Children's Aid Societies. He was a loyal friend and co-worker, and lived a noble, unselfish life, leaving a place that cannot easily be filled.

No Large Gifts to the Work.

A great disappointment has been the failure of wealthy men to give financial support to the Children's Aid cause. There have been practically no large contributions, and there are many cities and large towns where one or two persons could, without any great sacrifice, maintain an agent and thus enable the Society to accomplish something. In other cases, good people, by uniting, could easily provide a children's shelter and, yet there are many cities and towns still without this necessary provision for the temporary care of neglected children. Our efforts will continue to be directed along the line of securing the services of efficient men and women, who, working from different centres throughout the Province, will enable us to reach the point where we can truthfully say that no neglected, ill-treated or homeless child can be found. In passing, it might be noted that just now good agents are badly needed at Kingston, Sault Ste. Marie, and Chatham.

Dominion Act re Juvenile Offenders.

It will be remembered by those interested in child-saving work that an excellent Act was passed by the Dominion Government in 1908, bringing our legislation for the saving of juvenile offenders up-to-date in every respect. In Ontario the juvenile court movement was pioneered nearly twenty years back, and now, with an Act applying to all Canada and to criminal offences, better work than ever should be done.

The Playground Movement.

There has been gratifying progress made in the movement to secure equipped and supervised playgrounds for children. Playground Associations have been formed in Toronto, London, Hamilton and Ottawa, and they are conducting a vigorous campaign for the recognition of children's rights, meeting with much encouragement from wealthy citizens and the municipal authorities. The newspapers, with practical unanimity have also given hearty support to the movement. No doubt many new playgrounds will be provided, to be followed by play-buildings, where at all seasons children can gather for clean and healthy amusement.

Protection of Infant Life.

In spite of all our laws for the protection of children it still seems necessary to confess that there is much carelessness and inefficiency in our methods of protecting infant life. While the child born in wedlock is lovingly and carefully tended, the unfortunate little one whose coming into the world is regarded as a misfortune and disgrace is traded away to anyone who will assume the burden. Recent exposures and police court trials reveal the heartlessness with which the traffic in infants is carried on, and the need that constantly exists for vigilance and insistence on right methods. To prevent abuses, every illegitimate child should be recorded and supervised by competent authority until it is at least one year old. There might be exceptions, of course, where a child has been adopted by reliable parties, but the rule is one that should be observed everywhere if we desire to stop the infant murder that is so prevalent. A few of these infants are deliberately put out of the way, but many others are slowly starved and neglected in such a manner as to bring about death in a slower but even more cruel manner.

Ontario's Pioneer Work.

The far-reaching influence of our Ontario work has always been a source of inspiration and encouragement. The Children's Act, as we have it in Ontario, was adopted eleven years ago in the Provinces of Manitoba and British Columbia. Later it was placed on the statute books in Nova Scotia, and two years ago the Provinces of Alberta and Saskatchewan passed the legislation and appointed superintendents to organize and encourage Children's Aid Societies in the various rapidly growing towns of that new country.

It is also pleasing to note that as a result of addresses by Mr. W. L. Scott and Sir Louis Davies, of Ottawa, a Children's Aid Society has been formed at Charlottetown, Prince Edward Island, and an Act has been, or will be, enacted in that province this year.

In the Province of Quebec the Children's Aid Society of Montreal is making good progress and gradually interesting the public in this modern method of effectually caring for neglected and dependent children. Legislation has also been promised by the Quebec Government putting the Dominion Act *re* Juvenile Offenders into force this year.

And not only in our own country has progress been made in the children's cause, but in many of the United States and in the Old Land the Ontario legislation has led to great and far-reaching reforms. Thousands of leaflets, pamphlets and reports have been sent broadcast and have done good service in many directions. Almost daily requests for information are received from all parts of the world.

Starting for new homes

INCIDENTS IN THE WORK.

The spirit of the Children's Aid movement can probably be best illustrated by a few general incidents selected from the daily routine.

> "She, though poor and a widow, opened her heart and home to this orphan child."

The above sentence was written by a clergyman who also acts as an honorary agent of the Children's Aid Society. A few years ago a wretched and discouraged mother ended an ill-spent life by suicide, leaving a girl of five to the tender mercies of the world. There were no relatives, and such was the reputation of the mother that the local people were unanimous that the orphans' asylum or reform school was the proper place for the child. But there was one poor woman to whom the prayer, "Give us this day our daily bread," was an ever-present reality. Without consulting anybody or even letting it be known what she was doing, she took the child in and for two years past has made her maintenance and training a matter of faith and of prayer. The busy world has forgotten all about this act and only one or two who know the inner life of the home ever bother about woman or child. But when the roll call of those who have been made perfect through suffering and self-denial is read, this humble Christian woman may well appear bearing in her arms this lamb of the flock whom she rescued and cared for in the time of need.

Loving the Unlovely.

Animated by the Christian spirit people have been led to make sacrifices and to perform acts of kindness that all the money in the world could not purchase. Probably in no line of activity is this so often in evidence as in the management of work for homeless children. Children frequently come along who, through poor birth and defective or neglected training, are undesirable in health, appearance and habits, but when their homeless condition is made known to Christian people there is always some kind heart ready to give the child the shelter and love and care that it requires. Here is one of these beautiful instances of unselfish love:—

A little girl about five years of age was taken from the vilest surroundings. Her whole history indicated degeneracy. She was weak and undeveloped, with blood so poor that her skin was almost constantly covered with eruptions, and to crown all, her sight was almost gone, the doctors expressing the opinion that only the

greatest care would save her from ultimate blindness. In the country, nestling snugly beneath the shade of trees and with the fresh air blowing across fields of corn and wheat, was a farm home where a warm-hearted woman longed for some child to love. She wrote to this office, describing what she would like, but was informed in reply that the only little girl needing a home at the time was one frail child to whom nearly every door was closed because of her defects. The woman came to Toronto, and although fully informed and seeing for herself the child's condition, she did not hesitate. Going down to the large stores she purchased all the warm clothing the little one would need through the winter, and returning gathered the child in her arms and shed happy tears in the prospect of ministering to her Lord in the person of this utterly friendless child. The doctor who had been attending the child could not believe it possible that any woman in her senses would adopt her, but when the facts were explained and the home described, he remarked, "The only thing on earth that would save her."

Saved in Time.

The following interesting item is taken from a report made by an Agent concerning a ward of the Children's Aid Society:—

"When we got this child she was little else than skin and bone and was quite unable to stand. Her mother was a victim of drink and two other children were found dead in bed with her at different times. Katie could not have lived many more hours with her. We had little hope of saving her life, but now she is a beautiful child, in a good home, and is growing strong."

Better than a Reformatory.

About twelve or fourteen years ago a young girl, then probably about thirteen years of age, was brought to the secretary of a children's society by her mother, who stated that the girl was unmanageable and disobedient and on the street most of the time. She was taken in charge and subsequently sent to a farm home. Mrs. Harvie visited the home several times and noted with satisfaction the progress of the girl. She was treated as one of the family and sent to school. She also had the privilege of attending church and Sunday School. The girl seemed to appreciate her privileges and returned the affection she received from the members of this family. Eventually she married a well-to-do farmer and is now specially comfortable in her home. Both she and her husband are members of the church and are spoken of as being good Christian people. This former ward is happy in her relationship with her husband and says there is nothing further she could desire for her happiness.

His Prospects Improved.

A fine, straight, manly-looking fellow of seventeen called at the office the other day to talk over his future and to express gratitude for the help that had been given him. For over two years past he has been working on a farm with a man who took a deep interest in his welfare and encouraged him to develop character along right lines. He left this farm home under the most favorable circumstances, the people speaking well of him and sorry to see him go, and he freely acknowledging

that he could not have had a better home or more kindly influences thrown around him. He is taking a responsible position in a business house and expects to make something of himself in the future as he possesses both ambition and willingness to work. In addition to over twenty dollars in the bank, he had thirty dollars in his pocket and was both comfortably and respectably dressed.

How was all this brought about? Simply through his having been arrested on a charge of theft. He was living with his widowed mother in a small town and she found great difficulty in keeping him under control. Several situations had been found for him but he refused to work, and was pronounced even by his mother as incorrigible. The climax was reached when he stole ten dollars from a man, was arrested, pleaded guilty and was about to be committed to a reformatory. Application was made to this office for the legal papers on which to sentence him, and as a result of considerable correspondence it was decided to place him under the guardianship of the Children's Aid Society and see if removal to another part of the province would bring about improvement. He was sent to Toronto and every effort was made to awaken his latent manhood. The whole situation was gone over with him and he readily agreed to take a farm situation and do his best to prove himself worthy of confidence. During a probation of over two years he gave evidence of his reformation, and, as already stated, he goes to a good position with bright prospects.

From Gaol to Farm.

Not long ago a grand jury in their visit to one of the county gaols found there a boy between sixteen and seventeen years of age, and in their presentment they suggested that his case should be reported to this office with a view of having him assisted in some way to become a good citizen. Letters were received a few days later from both the crown attorney and the sheriff, and arrangements were made whereby the boy could be released at any time. The following day a farmer from another part of the province called to say that he and his wife thought of taking a boy to assist around the place, and as they had no children and were anxious for company, he promised that the right boy would have all the home advantages that could be given him. A young lady was despatched on the train to get the boy and bring him to Toronto and the lad was greatly astonished to find himself transferred from the custody of a gaoler to the society of a lady who surprised him by her friendly interest and solicitude over his welfare. Coming along in the train he unburdened his mind and heart to her, telling of his mother's death, his father's chronic invalidism and the way he had been buffetted about. With the small amount of money in his possession he insisted on buying her a box of chocolates, for, he said, with tears in his eyes, "You are the kindest person I have met since my mother's death." He was handed over to the farmer who had remained in Toronto to meet him, and the two went off to the country the best of friends. So far this experiment has been entirely satisfactory to all concerned.

A Cleaner, Consequently Happier, Home.

Extract from an agent's letter: "There was a family in my district that were so extremely low in their tastes that their house was a most disagreeable place to enter. Everything about the place was dirty, as well as the mother and children,

and so cheerless that it was not to be wondered at that they spent most of the little money they obtained on whiskey. After repeated visits and a threat to take away the children for good unless there was a decided change, the parents began to pull together, and every day saw some fresh improvement. I dropped in on Christmas to see how things were going and was astonished to find a Christmas tree in the centre of the room with toys and decorations. One of the little girls, who evidently under-

Fine, Manly Boys

Thrown by desertion and misfortune upon the charity of the community. We seek for them real homes.

stood that the Children's Aid Society was responsible for the miraculous change, came and hugged me very vigorously, and the mother gratefully acknowledged that it was a better Christmas than they had known for a considerable number of years. The best feature about it was that the dinner that day was not supplied by charity, but was earned by the father of the household."

Placing a Boy.

Another encouraging report: "A happy incident of the Christmas week was the following: During the late summer a boy of eleven years was arrested and convicted of theft. Under ordinary conditions he would have gone to the reform school, but we were able to have him placed under the guardianship of the Children's Aid Society instead. After a probation of two months in the Shelter, he showed himself anxious to be a good boy and a foster-home was sought for him. Last week I took him to M., where a farmer had written me that he would meet us. When we got to the station there was a fine, hearty-looking man waiting for us. He told us afterwards that he weighed 230 pounds, and he was a fine, well-proportioned man with a very kind face. When he came up to us he said, 'Is this my boy?' and he bent over and kissed the lad. This was quite a surprise to the boy and a few minutes later, when he got the opportunity, he said to me, 'I know I am going to like that man.' We were both driven to the farm for the night, and the next day he drove me twenty miles to see three different neighbors and ask them if they would not open their homes to one of our children. I came away from his place cheered and encouraged and rejoicing in the work that was mine to do."

Improving the Home.

The preventive character of Children's Aid work cannot be too much emphasized, as there are almost daily instances where a visit and an earnest talk from an agent has had the effect of so improving the home conditions as to save the family from impending ruin. It is not always possible to clearly demonstrate good work of this kind, but here is an instance that is worth while: A man who had been suddenly left a considerable sum of money gradually got into idle and convivial habits, until he squandered nearly all the money and was known as a confirmed drunkard. His wife, gradually becoming discouraged, followed his example and was also known to be frequently intoxicated. In fact, it was shown clearly that nine quarts of whiskey alone went into the house every week. There were several interesting and attractive children in this family and naturally they suffered greatly from the habits of the parents—no clothing, no schooling, no moral instruction. At last the neighbors complained and an agent was sent to see what could be done. He talked to the parents, explaining the law, and informed them that the children would have to be removed entirely from their guardianship. They were greatly distressed at this news and begged for an opportunity to show that they could reform. The result has since been that the home is in better shape than it has been for years and the children are cleaner, happier and more likely to be given fair opportunities in life. It has been a dear lesson to these people, for it is said that they squandered some thirty or forty thousand dollars within the past few years.

Foster-Parents not all Selfish.

It is often charged against those who take children to care for that they are more concerned about the amount of service they can obtain than the benefits they can confer on the children. This little history is a refreshing instance of a totally different attitude on the part of foster-parents toward the children who have been

placed with them: A little girl had been neglected and ill-treated in her home and was given over to the guardianship of the Children's Aid Society by a magistrate. She was a wayward child, not attractive in manner nor appearance and there was some difficulty in placing her satisfactorily. However, after two or three trials a good home in the country was found, where she was accepted and loved as a member of the family. In six years' time she grew to be a tall young woman and then the restlessness came upon her that seems to be inseparable from the period when a girl is verging into a woman. Mothers know full well the anxiety that their own daughters cost them in trying to guide them safely through this period of their lives. Eva had grown lonesome in the country and wanted to see something of the noise and bustle of a large city. She left suddenly for the city and was lost track of until, as so often happens, her health failed and she had to go to a hospital. Probably through pride or shame she did not notify her foster-parents, but she spoke often of her foster-home and hoped to go there at Christmas. About two weeks before Christmas she died, and her foster-father, hearing accidentally of her death, went to the city, claimed her body and brought it home with him. A funeral was arranged such as would be given to an own daughter. There were two sets of pall bearers, young men and young women—several clergymen were at the funeral, and everything was done that love could suggest to show respect to the memory of one who was a waif, and for whom her foster-parents had already done all that could reasonably be expected from them.

A Cheering Incident.

A few years ago a family of neglected children was committed to my guardianship from the north-eastern part of the Province. They had been greatly neglected and had never known any of the ordinary comforts of life, not to speak of educational or religious advantages. One of the children was a girl about ten, plain-looking in appearance but affectionate in disposition. She was placed with a lady in a prosperous farming district and they were soon close friends. This lady became ill and the little girl faithfully waited upon her and anticipated all her wishes. In spite of care, however, she passed away recently, and when her will was opened it read, "To my faithful friend and nurse, Annie, I leave the sum of one thousand dollars, this amount to be the first charge on my estate after just debts and funeral expenses." Not all faithful service is rewarded in this way, but it is pleasant to learn once in a while that gratitude takes so practical and substantial a form.

Taken from the Poorhouse.

Some fourteen or fifteen years ago, while calling at one of the county poorhouses, a bright boy of ten was found among the inmates. There was no one especially interested in him and he was clearly in his wrong element. He was taken back to Toronto and in a short time transferred to a farm home. For some years favorable reports were received concerning him, but he changed his place and his address was lost. During the past year, when visiting a small town, it was necessary to hire a livery and when stepping into the vehicle the driver called me by name. Asking who he was, he replied that he was the boy who had been in the poorhouse years before, and from his conversation and appearance he seems to have done well since that time.

Crime Resulted Through Delay.

It is safe to say that many serious crimes have been averted by the timely interference of the Children's Aid Officer, adjusting family disputes, and insisting on the removal of improper home conditions. To illustrate this the following actual occurrence might be given where through lack of prompt action manslaughter was committed.

An agent of the Children's Aid Society had information that a home in which children were living was being run as a disorderly house. Although evidence could easily have been obtained showing that men gathered there at night, drinking and carousing, the police did not consider there was sufficient evidence to interfere, and the case was allowed to stand. A month later, as the result of a drunken row, a man was found dead at the back door in the early morning hours, and after trial and conviction the parties keeping the house were given penitentiary sentences.

Wrong Environment.

There is a young man in the Central Prison at the time of writing, whose early history will be of interest to those engaged in child-saving. He was, when six years of age, given over to the Children's Aid Society by a relative, and was placed in a good home in the North-West. The mother at the time was ill and not expected to recover, and was said to be a consenting party to this arrangement. Later on she demanded the boy back, on the ground that she did not sign any agreement giving up her child, and although the home was not what it should be it was decided to get the boy back for her. Had he remained in the country home to which he was sent he would in all probability have become a fine, industrious and prosperous young man instead of, as he is now, undergoing a year's sentence of imprisonment. Environment has much to do with the subsequent career of most of us.

Boy Twelve Times Arrested!

A magistrate wrote the other day saying that he found it absolutely necessary to commit a certain lad to a reform school, for he had found, on looking up the records, that the boy had been before the courts no less than twelve times within three years. "And the worst of it is," he added, "the fault is not so much with the boy as with the home, the parents being worthless people, who treat his delinquency as a joke, and give him no encouragement to do right."

Now what is the best thing to do in just such a case? On the second appearance of such a boy in court he should be placed under the guardianship and control of the Children's Aid Society. It is not necessary that he should be removed entirely from his home, but the agent and executive officers would then have some right to direct the boy's movements and insist upon the parents discharging their obligations. This is what is popularly known as "probation," and wherever there is the right kind of organization, and the right effort made, good results invariably follow.

A Child's Winning Ways.

A lady who had been anxious for years to adopt a little girl was at last rewarded by the pleasing information that a particularly sweet child was awaiting

her if she would come to the city and take her home. Being unaccustomed to city ways she commissioned a lady friend who was going to the city on other business to attend to the matter for her. This lady had no children of her own, and when she saw the child her heart went out towards her at once. She took the little one on her shopping expeditions, and by the time she reached her home was so greatly

Future Citizens.

In caring for and protecting their interests the Children's Aid Society renders the highest kind of patriotic service.

attached to her that she decided to postpone handing her over for a day or two. This went on for a week until the lady for whom the child was originally intended got uneasy and inquired what had become of her prospective ward. Her friend then had to confess that the little girl was in her house all the time, but tried to

convince the lady that another child would be found for her soon. This occurrence created bad feeling, but fortunately it turned out all right in the end, for another little girl was found and two children instead of one were well provided for.

Self-Supporting Laundries.

A thought that has impressed itself on my mind with great frequency has been the need of several small homes or retreats, where girls who are not able either mentally or morally to take care of themselves, might find a safe shelter, and by their efforts at laundry work be practically self-supporting. There is a general demand at the present time for additional shelters for the feeble-minded, and at moderate expenses three or four of these homes in different parts of the Province could be started and the situation greatly relieved. A committee of ladies could easily inaugurate and carry on a small home of this kind, and after the initial expense of providing a building and equipment very little outside help would be needed. This suggestion should meet with the approval and co-operation of ladies interested in the moral welfare of their sex.

Duty Becomes a Blessing.

In writing about two children that had been adopted two or three years ago the foster-father expressed himself as follows: "You will be surprised to hear that Lillie has already passed into the third reader, and Walter promises to be quite brilliant. They are both strong, healthy, happy and good children, and what we first believed a duty has become a real blessing."

Careless Fathers.

A magistrate recently informed me that twenty young boys had been before him in one month for various serious offences, and only in three cases could he get the fathers to voluntarily appear in court. They seemed to be quite indifferent and to be satisfied to leave the boys to their fate. The father of a boy of nine was asked what time the lad came in at night and he replied, usually between ten and eleven, though he had stayed out occasionally till nearly twelve. It was true, he said, that he allowed the boy to sell papers, although he himself was earning fifteen dollars per week. The boy needed pocket money to go to the show, etc., and the father thought it was all right to let him do so. Other cases reveal the same indifferent attitude on the part of fathers, and apparently they imagine they are not in any way responsible for the conduct of their children. They certainly should be held responsible, and if an example were made of one or two such fathers there would soon be an improvement in the way children are cared for.

Danger of Relying Upon Institutions.

There is a certain amount of danger in making reformatories or other institutions for children too popular and attractive, since there are parents who will hasten to place upon the state the burden of the maintenance of their children which they themselves ought to bear. There are delinquent children for whom

there seem to be no other means of reformation than a course in an institution organized for that special purpose, but care should be taken to avoid, as far as possible, the deadening effect of routine. When large numbers of children are handled in a mass you cannot bring out all that is best in each, nor do you add to their individual self-confidence, and—a greater defect still—their sense of personal responsibility for their actions is apt not to be educated to the point of causing them to refrain from doing wrong because it is wrong. It must not be forgotten that the chief factor in the reformation of a delinquent child is not the institution, but the persons in the institution with whom he is brought in contact. The superintendent and his assistants should be possessed of an intense love of children, a large charity for failures, and a habit of self-control that will command respect from the pupils.

Children and Crime.

Those who are intelligently studying the problem of CRIME AND ITS SUPPRESSION hold strongly that a more thorough system of caring for neglected children and young offenders is the true solution, and that only by cutting off the supply can the habitual criminal be eliminated. A youth, growing up in a vicious home or without proper parental control, is almost certain to be a law-breaker at twelve. As a first offender he is discharged on suspended sentence, but not until he has gained an insight into police methods that will make him more expert in avoiding detection and more hardened in his vicious ways. The absence of adequate supervision gives him a latitude that almost invariably lands him in trouble a second time, provided he has no salutary home surroundings. A first apprehension is a crisis in a boy's life that calls for great wisdom on the part of those having to do with his fate, for it means the parting of the ways between the good and the evil career.

Humane Method of Dealing with a Boy.

An enthusiastic agent of one of our Societies was able to save a boy from prison by going to the employer from whom money had been stolen and getting him to appear in court and offer to take the boy back and try him again. The plan worked well and the boy has given no further trouble. The agent justifies this humane treatment as follows:

"The old method was, when a boy had done wrong, such a wrong as would bring him under the Criminal Code, he would be arrested, put in the cells, brought before a magistrate, and sent to prison, there to complete his criminal education and come out to be a still greater menace to the community. And this would be the course pursued no matter what the temptation might have been to the young boy or what his unfortunate surroundings in early life might have been.

"In these days the process is rapidly changing. A boy is charged with having stolen some money. He has had no real opportunities of growing up to a good life. He is sorry that he did the wrong. The money was restored. It had been left carelessly exposed—a temptation to almost any person. The boy is talked to kindly by the Children's Agent, expresses himself as being sorry for what has happened, wants to lead a good life, and grow to be a good citizen. When the matter is presented to him in the right light, the man from whom the money was stolen offers to take the boy back to his home, and even goes bond for his good behaviour.

"The old way crushes the boy down; the new way seeks to lift the boy into a better life. Which is the better method?"

The Proper Way.

Three boys in F. were brought before the magistrate by the police. He sent for the inspector of the Children's Society and asked him to take charge of the case. The homes were visited and the parents made to realize their boys were going in the way of evil-doers. The boys promised to act better and the parents undertook to look after them more carefully. They will be kept under vigilant but friendly suspension as to their future conduct.

Placing Wayward Children with Relatives.

The following is one of the good results of having a children's agent visiting different parts of the country from time to time: On reaching a certain town, the agent found that a boy had been arrested for a petty offence and placed in the gaol. Investigation showed that the father had deserted the family and that the mother had been unable to properly look after the children. The boy was taken to a shelter in another town and arrangements were made for him to be taken care of by an uncle, who was quite willing to assume the responsibility. There have been hundreds of cases where adjustments of this kind have been happily arranged.

County Councils.

We often hear it charged that County Councils are exceedingly close when it comes to a grant to the Children's Aid Society, and it must be confessed there has been a good deal of reason for this charge in some districts. A curious instance came to notice some time ago where the individual members of the Council were all heartily in favour of the Society's work, but voted collectively against a grant under the impression that the ratepayers expected them to be economical. Children's Aid Societies have been greatly discouraged by this attitude, but should continue the efforts to enlist the sympathies of the county councillors until they meet with greater success than hitherto.

District Children's Shelters.

There are several districts in the Province where a Children's Shelter could be opened with great advantage. There are quite a number of instances where children are neglected, not so much from design as from force of circumstances. Mothers are left without a bread-winner, and are compelled to go to work leaving small children to their own resources. In other cases the mother dies leaving the father with three or four children and no way of having them cared for. A combined children's home and shelter capable of accommodating about twenty-five would be exceedingly useful in helping such persons to tide over until suitable arrangements could be made, and the children would be saved from much suffering and privation. There is no need for the permanent institutional care of de-

pendent children, since we are unable to meet the constant request for children for adoption, but in this temporary care there is a real work that might be done that has not yet been fully covered.

Parental Rights or Children's Rights?

About six years ago, after several earnest appeals from mission workers, a number of children were taken away from worthless parents and placed under the guardianship of the Children's Aid Society. In signing the order the magistrate showed considerable reluctance, and when six months later the parents appealed to him, he insisted that they should have the children back again, and rather than incur the displeasure of refusal, the Society took the little ones away from respectable foster-homes and placed them again under parental care. Since that time the oldest boy has been committed to the Reformatory, the second boy has been arrested for burglary and other offences, but let off on account of him being just nine years of age! Two other children are continually on the street begging and pilfering and certain to grow up undesirable citizens. The parents are utterly worthless people who care nothing about the moral training of the children and the magistrate, owing to his regard for their feelings instead of the unfortunate children's and the community, was really responsible for this group of neglected children. In addition great discouragement was caused to earnest workers who are seeking to secure a fair measure of justice for minor citizens.

Children's Children.

It is interesting to note that as the years advance one is frequently called upon to give advice and assistance concerning the children's children. For instance, in one morning's mail there were three letters from girls who had been helped from ten to fifteen years ago. One was married and had three children, and the sudden death of her husband prompted her to apply for advice as to her future movements. Another describes the physical ailments of her little boy and asks for advice about obtaining hospital treatment, and the third tells of the growing neglect and indifference of the husband, and suggests that perhaps a letter to him or a visit would result in a change for the better. Such letters are now becoming of frequent occurrence, and even if no additional children were taken in charge for the next five years, there would be a continuous stream of communications calling for a wide variety of action. It is, of course, exceedingly interesting to hear from these former wards, and to be able from time to time to encourage and befriend them.

A Good Act not Forgotten.

One of our agents sent in the following encouraging incident: "Over twenty years ago there was a young fellow arrested for some offence against the law and fined $5 and costs or thirty days in gaol. He had no money and was about to be committed when I stepped up, paid his fine and gave him enough money to pay his railroad fare to another town. For twenty years I heard nothing from him and did not know where he went, but this spring he came back, a prosperous, fine-looking man, whom, of course, I did not recognize. He sought me out and brought

to remembrance what I had done for him, and then he paid me back not only the money I had advanced, but also interest on it for twenty years, telling me at the same time that he had never ceased for a moment to remember with gratitude what I had done for him."

Never Had a Real Home.

In studying the history of a group of reform-school children recently we came across a boy born in Ontario who at fourteen years of age had never known what it was to live in an ordinary family. He was deserted as an infant, taken to an Infants' Home, transferred to a Boys' Home, and then, when at twelve years of age he began to grow rebellious, was brought before the magistrate and committed to the Industrial School as incorrigible. He was sullen and defiant in manner, and no wonder, for without being told the exact cause, he realized that he had not been brought up in the right way, and that he had in some way lost many of the privileges of ordinary children.

During the year a boy was sent to a foster-home who had been eleven years in a public institution. He had not suffered materially, though there were many things familiar to the ordinary boy that he did not know anything about. One of his first acts was to climb a tree, something which he said he had never done before.

The Spirit of Emulation.

In dealing with wayward and troublesome children, praise and encouragement is far more effective than scolding, even where they are not only to blame, but apparently deserving of chastisement. When a man complains that a boy I have sent him is doing badly—disobedient, lying, stealing, threatening to run away, etc.—I write to the boy, not to warn or remonstrate, but to tell him how much I think of him and what great things I expect from him, and this is nearly always effective, as witness a sample reply from a boy of fourteen:

"Dear Sir,—I got your letter last week and was pleased to hear that you want me to get along and be a good boy, although I have not been a good boy. And I have come to the conclusion that the way I have been carrying on is not right, and if I want to stop I will have to change my ways, which I intend to. I have not been doing my best to please Mr. and Mrs. F., but I will change my ways now and try to please them, and do my work satisfactory to Mr. F."

Truancy and Delinquency.

It is acknowledged by all interested in work among children that truancy is an active and prevalent cause of delinquency. Not only do children voluntarily absent themselves from school, but many cases are met with of parents who are short-sighted, inconsiderate and some positively selfish in the motives which cause them to keep their children from school. Whether the cause be childish mischievousness, lack of proper supervision or exploiting the labour of the child to minister to parental dissipation, the result is a crop of ignorant lads and young men who are led by easy stages from petty pilfering to robbery and other serious crime.

Sympathy Easily Aroused.

One hears a good deal about the hardships of the orphan who is sent to the farm home, but little is said of the great work done for dependent children in maintaining and caring for them through years of helplessness. For every one case of neglect or ill-treatment of the foster-child, there are dozens who are doing

Motherless!

Love is the food that child nature craves. It goes to waste in the country home, while the little hearts pine in the crowded city institution.

exceedingly well and receiving every possible care and attention. In a batch of reports received to-day, the visitor gives a pleasing account of a little girl, who was taken by a farmer in the western part of the Province. She was not long there before she developed tuberculosis of the bone. Instead of returning her to the

Society these good people sent for their doctor, and the child for the past year has been receiving the best possible care and attention. The visitor concluded his report with the following: "It is very gratifying to find that the Children's Aid Society has so well fulfilled its mission when it placed this child with Mr. and Mrs. S., who are financially able to bear the expense and willing to bestow the care necessary to nurse her back to health."

Ill-Treatment and Overwork.

With so many children placed in foster-homes in all parts of the country, it is absolutely necessary to see that they are given fair treatment and permitted to enjoy the ordinary pleasures and advantages of childhood. Two or three cases of cruelty to adopted children in the course of the year might seriously injure and retard the whole work, but if there is prosecution and exposure of the persons guilty of this offence there will be less likelihood of its repetition. Prosecutions were entered in four cases during the past year and fines imposed, and several other children were removed on account of unsatisfactory reports. As a rule, the children who are ill-treated are those who have been given out by irresponsible parties and no supervision maintained.

Wife and Family Desertion.

Public attention is again directed to the great evil of allowing men to desert their wives and families, thus causing great suffering and destitution and placing a heavy and unjust burden upon the charitable people of the country. Hardly a day passes that some children are not made homeless or sent to orphanages or reform schools through the father going away and leaving his family unprovided for. Men are arrested and brought back hundreds of miles for stealing some article worth only a few dollars, while others are unmolested who have thrown off their most sacred responsibilities and obligations toward wife and children. Such men should be prosecuted without depending upon the consent of the wife and placed under bonds to pay their earnings to their families, failing which they should be sent to an industrial prison and an allowance made for those dependent upon them.

Working Mothers.

One of the main causes of delinquency in children is to be found in the large number of poor mothers who are compelled to go out working leaving their children unprotected and untrained. This problem constantly presents itself. When children are allowed to grow up without a good mother's supervision their natural destiny is the reformatory, the prison, or, in the case of girls, the brothel and haven. The subject is well put in the following extract from an English publication:

"The one reform in our social life which has been scarcely touched in the nineteenth century is the relief of married women from heavy manual labour. The aristocracy of the human race are the Jews. For several tens of centuries they have forbidden their womankind to exhaust themselves and injure their unborn children by toilsome bread-winning at a period when rest is natural in the interests

of the individual, and desirable in the interests of the nation. Whether you go to the poorest Ghetto of a Polish or Russian city where Jews mostly congregate, or to the quiet congregation of Hebrew children in the Free School of the Jewish community in the East End of London, you will find a strange refinement and delicacy of type among the little ones. They are all 'ladies' children.' Even in the Jewish agricultural colonies of Cherson, where women's labour is no less valuable than in Canada, Essex, or Australia, the married women are not allowed to work in the fields. The almost uniform quickness and brilliancy of the Jewish intellect and the singular immunity of Jews from some forms of disease, are, I consider, directly due to the respect paid by them to their women at critical periods of their lives. It affronts my senses of racial pride that there should be any people on earth who treat their women with more wisdom and consideration than the English, and I earnestly hope to see in the early decades of the century a new respect for women spring into life and practice, and that the result will be to grade up the physical stamina and develop the mental alertness of English child-life. All politics converge in the home, the unit of the nation. To improve the home we must care for the mothers. If it be said that care for English women and children is inconsistent with our industrial system, so much the worse for industrialism. Since the French Revolution, sensible men of all religions and economic schools are aware that the condition of the people is the only question of real importance. The pivot of the whole situation is the mother. When we realize what she is to the nation, we men will repay to our sisters the debt we can never discharge to our mothers. By 1920, it shall be counted socially disgraceful to allow a woman to engage in hard labour abroad; while an idle man, whatever his rank, who is supported by his wife, shall be visited with the contempt of society."

Canadian Institute of Social Service.

We have many organizations in Canada for the promotion of social and benevolent work of all kinds, but through lack of unity and co-operation there is the danger of effort being dissipated and practical results postponed indefinitely. Needed and pressing reforms have been vigorously advocated by various organizations and then dropped just when it seemed as if the time for action had arrived. Many excellent societies, also, get into a routine method of doing their work, and do not advance with the times, and would profit by the intelligent criticism of a general organization surveying the whole field and having the social welfare of the whole community as its mission. In England the British Institute of Social Service offers a pattern that might be copied with advantage. Its objects are:

To collect, register, and disseminate information relating to all forms of social service, in order:

(1) To make such information available to all concerned in the improvement and elevation of our national life.

(2) To promote the initiation and development in this country of the most beneficial and successful forms of social service.

(3) To give assistance to all organizations that have social aims, and to facilitate co-operation between them; and, so far as possible, to prevent overlapping.

Court of Social Adjustment.

The ordinary police court, in which all sorts of offences against the law are publicly inquired into, does not seem the proper place in which to bring about the adjustment of family disputes, or to secure a fair measure of protection and justice for the many women and children who suffer through the wrong-doing of worthless fathers, etc. In hundreds of cases women have continued to suffer the greatest misery and degradation rather than face the publicity and newspaper advertising of the police court. Some day we will surely arrive at a point where judges and magistrates will be specially appointed to legally adjust cases of domestic infelicity and injustice without requiring the unfortunate victim to appear before a motley crowd of curious spectators and an array of reporters with pencils sharpened ready to give an interesting story to the world.

Moral Hospitals.

In this connection also the hope may be expressed that the police court, which is the people's tribunal, will more and more be regarded as a moral hospital, where the aim will not be merely to secure conviction and to pass sentence of imprisonment, but rather to discover the cause of the moral disease and apply such remedies as will restore the unfortunate person to the good opinion of himself and his friends. Our social organization for the rehabilitation of the law-breaker is still far from perfect, and the place to bring about improvement is not so much in the prison as in the police station and the court before the stigma of conviction has been finally registered.

Publishing Childish Offences.

If our newspaper friends fully understood all the harm that is done by publishing the names of children who have committed offences against the law, or have been guilty of foolish escapades, they would hesitate before putting this serious obstacle in the way of young people reforming and living down a bad name. Full details might be given of the occurrence, as that might be somewhat of a warning to others, but the names might easily be omitted and the child referred to as a boy of thirteen or a girl of fifteen. If some representative of the press having influence in the Press Association would bring this up at one of the conventions, and have a resolution put on record condemning the practice, it would have a far-reaching effect in helping child-saving work.

EDUCATION FOR EVERY CHILD.

Our school laws are designed to give every child born in the land an elementary education. The compulsory education law is supplementary legislation to compel the careless and indifferent to send their children to school and thus make sure this universal education.

The time has come in our civilization when illiteracy must be entirely banished. We have infinite pity for the men and women who are unable to read and write and who are deprived thereby of at least one-half the pleasure of existence. All our administrative laws and methods aim at effectually stopping this ignorance by requiring every child, however lowly his birth, to attend school and receive such education as will tend to make him a useful citizen.

Briefly stated, the Ontario law of school attendance is as follows:—

Every child between eight and fourteen years of age must attend the school of the section or municipality in which he resides.

Police commissioners in towns and cities are required to appoint and pay one or more truant officers for the enforcement of the law.

The Council of a township may appoint one or more truant officers and if the Council objects to appoint such officer before the first day of February in each year the board of a school section may make the appointment.

Every truant officer shall examine into all cases of truancy within his knowledge and also enquire into such cases as are reported by an inspector, school trustee, teacher or ratepayer. He shall warn truants and their parents in writing, and if parents refuse or neglect to send their children to school they are liable to be summoned and fined not less than five dollars nor more than twenty dollars; or, instead of this penalty, they may be required to give a bond of $100 that within five days the law will be complied with.

It is noticeable that the Act does not specify any punishment for the child, the responsibility being placed entirely upon the parent.

One difficulty in the past has been that many municipalities and township councils have neglected to appoint any truant officer, and at the present time it is safe to say that there are at least 150 to 200 districts where the law is not put in force. Efforts have been made from time to time by the Education Department to have this important work more generally taken up, but there is always more or less indifference to contend with—largely on the ground of municipal economy. For the same reason, also, the duties of truant officer have, in many instances, been added to the many other duties of the town constable and have not been taken seriously.

Failure on the part of parents to send children to school is often due to the poverty and wretchedness of the home life—lack of clothing and lack of good management in the direction of household affairs. Often there is the presence of drunkenness and vicious living, with children, under most baneful influences, rapidly

acquiring an education of the wrong kind. To secure the best results it is important that all truant officers should be inspired with a motive of helping and uplifting such people. Merely to order compliance with the law will not bring about all the improvement needed. There should be the kindly and sympathetic advice, and perhaps practical help, that will lift a family out of the slough of despond and get them to realize that the law is, so far from being arbitrary and unreasonable, intended to be for their protection and ultimate happiness and prosperity. For this reason I have often thought that a good innovation would be the appointment of women as truant officers. There are many excellently trained and practical women in need of a vocation, and, in addition to explaining the law to these negligent parents, they could in many instances bring the deft touch of a woman to bear on the home life and its problems. I need not elaborate this idea, for it can readily be understood in how many different directions this plan would work out for the general benefit of the community.

Then it would be well if all truant officers would act in co-operation with the Children's Aid Society, since the Children's Protection Act furnishes complete legislation for the protection of the child whose home life cannot be improved by kindly intervention.

Toward the strong, physically active, but mentally dull, youth from eleven to fourteen, great patience should be shown. It was probably a wise omission in the compulsory law that no penalty is prescribed for the truant, for it is a serious matter to commit such a lad either to a gaol or a reformatory. Some years ago a magistrate, with the best of intentions, sent a boy to a reform school for truancy, and when he ran away from that institution he was transferred to the Central Prison as incorrigible and was found there in stripes serving sentence as a criminal, although he had never been known to have committed any criminal offence. There are many such cases in which positive harm is done. There should be patient study of the boy and an effort made to adapt school training to his understanding and liking. Many of these truant lads would be perfectly happy if given a hammer and a few boards and nails, or put at some other occupation that would call their muscles into play. The lack of patient study of the boy has landed thousands of bright and interesting lads in reformatories and prisons, and has meant a tremendous financial loss to the community; therefore I feel that this point cannot be too strongly emphasized.

Another point—compulsory school attendance ceases at fourteen and there is no law by which boys are compelled to go to work at that age. Many lads, the sons of widows and deserted mothers, who are unable to control them, have got into idle habits. They make a pretense of selling papers and hang around amusement places, race tracks, etc., for casual work, with the result that they in a few years have no steady means of livelihood and either drift into crime or chronic pauperism. All such lads should be required to be either at school or work, and in large cities there should be an association to help such boys get into suitable trades and callings, affording constant co-operation with both parents and employers of labour, thus materially benefitting the community as a whole.

SLUMS.

The Menace of Town and City Life.

SOME PEOPLE say that slums are an inevitable evil in every large city—what has been must continue to be—a sort of fatalistic attitude from which there is no escape. But is this true? Can a city not be cleaned up and social life made both morally and physically decent—so that young and old may live, thrive and be happy? Surely it can be done—if only the right kind of effort is made! And it ought to be done. The need is urgent.

Slums result from three causes—lack of regulation and supervision on the part of the city, the greed of land-owners, and the necessities of the poor.

Webster's Dictionary says that the word "slum" is supposed to be a contraction of the word "asylum," and is "a back street of a city, especially one filled with a poor, dirty and vicious population."

This is only a partial definition, for a street, so long as it is a street, can with effort be redeemed from the slum condition. No, the slum is something worse than a back street; it is a lane or alley, a series of lots about one hundred and fifty feet deep, with three or four houses, hovels or shacks erected, one behind the other, and entirely hidden from the view of the ordinary passerby. It is a place where stables, barns and sheds have been converted into residences, not for one, but often for two or three families, with none of the ordinary requirements of home life.

In earlier days, men were either passively allowed, or took permission, to erect rows of lath and plaster cottages on lanes not fifteen feet wide; yards were divided and sub-divided, until in some districts there is a perfect labyrinth of hovels, absolutely lacking in sanitary conveniences, and in various stages of dilapidation and decay. Such a thing as "repairs" is never dreamed of, for the rent can be obtained all the same, and to fix up looks like unnecessary extravagance. The household refuse, slops, dish water, etc., are thrown outside the door, to sow the diseases that daily attack the inmates, sending adults to the hospitals and babies to the graveyard.

One could find in his heart some measure of sympathy and acquiescence if the hovels were built and owned by the poor themselves, but these places are owned by well-to-do citizens who sin against their city from avaricious motives, and live in luxury on the exorbitant rents imposed on the poor and comfortless occupants. Such conditions will never be altered voluntarily. Improvement can only come about through the enforcement of the Public Health Act.

Unexplored Regions.

These slums are exceedingly dangerous to the health and morals of a city because they are to the great majority of the people unknown and unexplored retreats. If leading citizens had to visit these places frequently, the dilapidation,

stench, and general misery of mothers and children would so appeal to them as to bring about a quick reform. They are not concerned because they do not comprehend the horrors of the situation.

Let in the Light.

Oliver Wendell Holmes, in one of his Breakfast Table Talks, in pointing out the value of publicity as a reformative agency, took for example a stone half-buried in the ground. Remove it from its place and you immediately expose to view a nest of slimy and creepy things that have made their home there. But let the sunlight in and they soon disappear. Is not this equally true of the slums? If there could be a drastic measure passed requiring every house in which human beings dwell to front on a forty or sixty-foot street, or else be pulled down, how long would drunkenness, vice and ignorance exist? Not very long, provided there was good municipal government and active Christian effort for social betterment. The slums should be attacked and abolished because they are the great enemy of the home, which is the foundation stone of the State. Bad housing conditions inevitably tend to drunkenness in parents; to delinquency in children; to disorderly conduct; to wife and family desertion by men who get tired of it all; to immorality in the growing generation owing to the lack of privacy and the consequent loss of modesty; to the spread of typhoid fever, diphtheria, scarlet fever, and the ravages of the great white plague.

Drunken Fights Frequent.

A photographer was adjusting his camera to take a picture of one of these wretched alleys, where there were twenty to thirty houses, when a small boy who was looking on enquired, "Say, mister, are you going to show where all the drunken fights are?" He grasped the situation intuitively.

No Incentive to Right Living.

Is it not natural that drunkenness, disorderly conduct and careless living should result when poor families are huddled into these out-of-the-way places, with nothing to encourage or inspire to self-respect and decency? When deprived of their fair share of space they fight among themselves—not that they are worse than other people, but there is the daily exasperation and sense of injustice that makes the temper hot and the tongue loose. It usually begins with the children. They have no place to play, and yet they cannot be still, so the neighbor's windows are broken, the dog or the chicken gets hit, and an angry woman starts after the offending lad. In a few minutes an angry mother comes to the defence, characters are torn to shreds —the father returns tired from his day's work, but he must defend the family reputation, and a fatal intimacy with the police court begins.

Neglect is Costly.

Drink is resorted to by the downtrodden—not from love of it—but to get a brief respite from care and worry; the boy takes to the street corners, the girl soon picks up undesirable companions, and in various ways the community suffers and pays dear for its neglect to insist upon proper home conditions for its poorer members.

Something to Live Up To.

It is a well-known fact that decency of life and conduct is a matter of enforced habit—a tribute of respect to those around us. If one lives on a nice street it is impossible to resist the refining influence of association, but in these back alleys and vile, evil-smelling rear hovels, how could one avoid being low and sordid and

Dangers of Street Life.

As a rule, boys should either be in school or learning a trade—newspaper selling, as a vocation, is a poor preparation for life's duties and responsibilities.

cynically indifferent to the rules of cleanliness and courtesy? Utterly absurd to expect it. Can children growing up in such unwholesome conditions develop the higher type of civilization of which we so fondly dream, and which many emigrants come to our shores hoping to find? Not at all. One or two here and there

by some fortunate accident may escape, but the great majority of children who are compelled to live and breathe daily the physical and moral atmosphere of the slums must inevitably be lacking in all that makes for good citizenship, either in physique or character.

Useful Lives Lost.

Disease finds its favorite stamping ground in the slums of a large city. Many a useful life has been prematurely lost because of the noisome pestilence that walketh at noontide. Infectious diseases have been carried into the schools and thence transmitted to unoffending families, and the Lord has been blamed for carrying off precious lives when the fault lay with a careless and indifferent municipality.

Prevention Almost Ignored.

We build orphanages, shelters, reformatories and hospitals, and delight to do the rescue work imposed upon us, but how little thought is given to the causes and conditions that create so large a demand for philanthropy and charity?

Constructive social work does not make the same appeal to the heart as spectacular charity, but surely in these days of investigation and research it should command greater attention and financial support from thinking men and women!

Better Organization Needed.

If some civic league, either now existing or to be formed, would but take this matter up with the same thoroughness that is given to commercial enterprises, where the gain is only material wealth, what great results might not be attained in a few years! The whole city would have cause to rejoice in the permanent uplift of its weaker and poor inhabitants, and the diffusion of the true spirit of brotherhood.

Suggested Changes.

In connection with the problem of the slum there are many changes that might be made with advantage to the general welfare. Here are a few suggestions along that line:

The abolition of slums by pulling down rear houses, and also houses built on some of the more notorious alleys and lanes of the city. The Health Department in every city should be upheld in a crusade against slums.

A clause in the municipal law that every dwelling must front on a forty or sixty-foot street, and that only one dwelling shall be erected to each 20x100-foot lot

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A philanthropic or municipal association to help working men to build and own their own homes, by advancing money at low interest.

The prompt removal of garbage and rubbish in the poorer districts and a daily "keep clean" campaign.

The prohibition of men and boys from taking wood, old clothing, etc., from the city garbage dumps.

The banishment of rag, bottle and junk yards from residential districts.

The closing up of all cesspools and outdoor closets in the thickly-settled part of a city and the substitution of modern plumbing.

Not public baths, but a bath in every home.

The appointment of women as well as men health inspectors and school attendance officers.

Widows with children, and deserted mothers, assisted to remain at home to train their children in good citizenship.

Regular medical and dental inspection of children and free attendance for those unable to pay. A trained nurse attached to each large school.

Closer inspection of the milk supply and pure milk furnished at cost to poor families.

Simpler instruction and more manual training in the schools provided for the poorer classes of children.

Numerous small neighborhood playgrounds with women supervisors to encourage and assist the children.

A school regulation requiring that every boy between fourteen and sixteen must learn a trade.

The providing of a number of boarding homes for working girls, equipped with baths, laundries and reception parlors.

The erection of a municipal lodging house for laborers and transients.

Provision for numerous public lavatories.

The establishment, by philanthropic people, of social centres where the poor may meet for companionship, recreation and instruction.

A municipal poor farm in the suburbs of every city for the care of the dependent and the training of inefficients.

—*J. J. Kelso.*

PRINCIPLES IN CHARITABLE WORK.

IN every line of commercial activity the desirability of organization and co-operation is being recognized and acted upon; and surely in a work so great and far-reaching as the administration of public charities and correctional enterprises it is equally if not more important that there should be correct methods and efficient direction. The impression seems to have prevailed in the past that each charity was distinct in itself and could be carried on successfully without reference to any other charitable movement—but modern thought is constantly demonstrating the fallacy of such a policy. The giving of aid to a poor family, the care of a homeless child, the segregation and reformation of the criminal, the increasing ratio of the insane, the elevation of public morals, the amusements of the people, are all integral parts of the same great problem, and the highest success can only be attained by a union of all the forces and a study of each phase of the work in conjunction with every other.

And the first step in this direction must be the bringing together of all the workers on a broad platform of friendly and sympathetic fellowship. All narrow prejudice and misconception should be put aside and workers confer with open and receptive minds, willing and anxious to learn, so that individual work may be better done, and the true interests of a great movement correspondingly advanced.

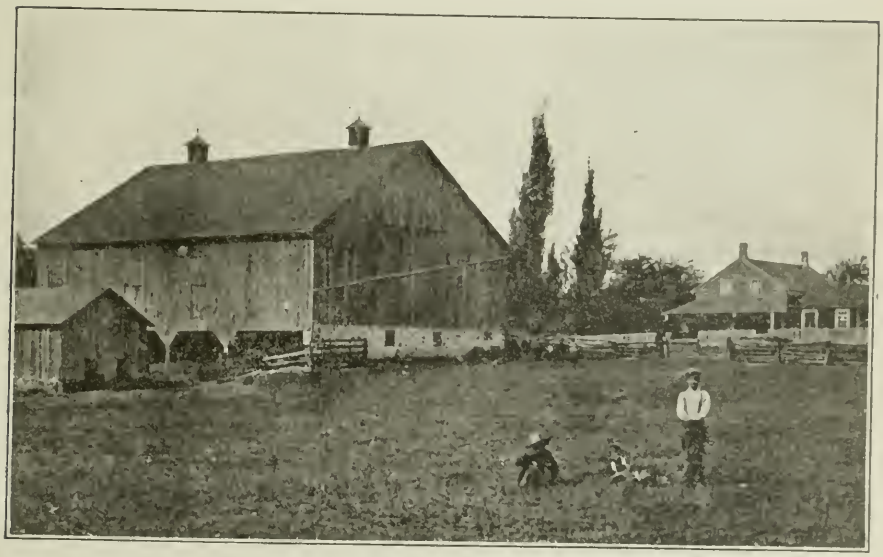
A definition worth quoting was given by the Secretary of the Charity Organization Society of London, England, when he said: "Charity is love and charity organization is love with discernment."

The best help that can be given to the poor is not money, but sympathy and employment, and the best help that can be given to a neglected child is not to put it in a public institution, but rather to so improve the home as to render the disturbance of the home relationship unnecessary. In all our work, whether for a child or adult, our highest success must ever be found in that which observes the Divine order of things, and the more carefully we study the great problems of poverty, disease and crime, the more shall we realize the need of mutual good-will and co-operation if we are to be true and efficient workers of humanity.

"We scatter seeds with careless hands,
And deem we ne'er shall see them more,
But for a thousand years their fruit appears,
In weeds that mar the land or healthful store."

The poor we shall have with us always—public institutions and benevolent societies will continue to have a place—children must be rescued from criminal and debasing surroundings—the defective and insane must be sheltered—but let us never lose sight of the fact that much of the misery that is in the world can be obviated only by a recognition of the claims of our human brotherhood, and the following out of the Golden Rule in all the relationships of life. If charitable

Gathering up the fragments



for transplantation.

relief were entirely stopped professional pauperism would soon become a thing of the past. Is not this a thought that should make us pause and ask ourselves if some of the work in which we are so earnestly engaged is really doing anything more than retarding the end which we have in view? As faithful workers we should delve deep into the social problems of our time, and aim, not at temporary relief, but eradication of social injustice—and it is only by united action, by an unbiased acceptance of the good features and a willing rejection of the bad ones, by cultivating a broad and generous spirit toward each other—by mutually considering our plans, our difficulties and our hopes, that we can look for the approval of our own conscience, the endorsation of a discriminating public, and, above all, the favour and blessing of the Supreme Ruler of the Universe.

In the distribution of charitable relief two seemingly opposite qualities are essential if the work is to be done to the best advantage—cool discrimination and infinite compassion. A noticeable defect in modern charitable giving is the carelessness associated with a kindly, generous feeling which prompts good people to give aid without closely enquiring if that is just the best thing to do.

What most people need who are temporarily impoverished is friendly visiting and advice and some work by which a little money can be earned. To give money without expecting any return is simply holding out an inducement to people to rely upon charity instead of upon their own exertions. Over and over again families have been seriously injured by the ready supply of money whenever they chose to apply for it; and, worst of all, the children quickly learn that it is easier to invent some story than to endeavor to help themselves. In this way is perpetuated a class who flatter themselves that they are doing a kindness to good people in applying for and using the money that is set apart for the express purpose of being given away.

The truth is forcing its way to the front that he who gives money to a poor man without asking any value in return is doing a positive harm not only to the individual, but to society at large. In England during the cotton famine (the time of the American War) large numbers of able-bodied men out of work were received into the workhouses. Many of these men who, in the first place, could scarcely be prevailed upon to accept public charity, could not be persuaded to return to work when business revived, but remained dependent upon the public. Their children also inherited this disinclination to become self-supporting, and the result to-day is a vast system of poorhouses in England, which is recognized by thoughtful people to be a real menace to the nation. Speaking for the working classes, whom he now represents in the British Parliament, Mr. John Burns said: "I have always been opposed to outdoor relief, except when administered with the greatest ridigity and given to the right people. It means the complete prostitution and degradation of those whom we ought to raise and educate by better means." Numerous testimonies could be adduced along this line, not only from leading thinkers and social reformers, but from ordinary citizens who have had personal experience of the harm done by over-generous and careless giving.

Going down one of our poorer streets in the centre of the city once I met a little girl whom I knew well. She carried a loaf of bread and a can of soup, and when I stopped to talk with her she told me that she got them at the poorhouse

and was in the habit of going for them every day. I turned away thoroughly discouraged, for, knowing something of the family, I knew that such relief was unnecessary and that this child, whom I had hoped to see grow up to have a wholesome respect for honesty and industry, was, by a too ready system of relief-giving, being steadily and permanently injured.

Careless outdoor relief in older countries has created and fostered a large pauper element, and we in Canada should beware lest we unwittingly follow their example. Let us make haste slowly in building up and extending our poorhouse system if we love our country and have any genuine regard for the worthy poor.

While true charity is a beautiful and Christ-like attribute, impulsive and misapplied giving is one of the greatest dangers of our modern civilization, and it is well to wisely and candidly consider the situation and its needs.

Let us seek to base all our work on the eternal principles of truth and justice, and then we shall cease to cover up defects in our social system with a patchwork of charity, which is a fraud and a mockery. Not charity but justice should be our watchword if we are truly aiming at the amelioration of distress and the elevation of the poor to the full stature of manhood.

What is needed is personal service, the complete organization of charitable forces, harmony of action, and the appointment of trained and experienced workers, instead of isolated action, rivalry and jealousy, and spasmodic and amateur administration. Only then can we hope to adequately relieve genuine distress and at the same time prevent the evils of pauperism from taking firm root in this young and rapidly-expanding country.

—*J. J. Kelso.*

CHILDREN'S AID WORK REVIEWED.

ADDRESS BY W. L. SCOTT, OF OTTAWA,

At the Canadian Conference of Charities.

Mr. Chairman, Ladies and Gentlemen.—I was the other day reading Justin McCarthy's "The Reign of Queen Anne," and I was struck by his statement that the inhuman cruelty with which the prisoners, male and female, of that day, and of even a very much later day, were treated—those awaiting trial as well as those under sentence—would be incredible were it not that it is amply vouched for by innumerable references to it in the literature of the time. The people of that day had not yet come to the idea that any treatment could be too bad for a prisoner or that fair treatment of him could result in any good either to him or to the community. So far did this feeling extend that at that time, and for long after, it was one of the amusements of fashionable men and women to visit the prisons and enjoy a view of the horrors.

Child rescue work in Ontario, the betterment of the conditions of the neglected and dependent and delinquent children, is very largely in the hands of the Department of Neglected and Dependent Children and of the Children's Aid Societies organized under its supervision and forming, in fact, branches or outposts of it. This Department, under the able superintendency of Mr. Kelso, and these Societies which owe to a very large extent not only their inspiration but in most cases even their existence to him, have for the past sixteen years been doing a work that is beyond all praise. But it is not so much with the good that has been and is being done that I am concerned to-night; I wish to indicate certain improved facilities which at the present stage of its development the work needs, and the providing of which would result in vastly more and better work than is now being done.

It must always be borne in mind that the children dealt with are of two classes, the neglected and dependent and the delinquent. Not that this is a scientific division. It is every day becoming more and more generally recognized that delinquent children are all neglected in one way or another and that if neglected children are not delinquent it is accidental that they are not so. But the two classes must be treated as distinct, in this country at least, first, because the methods of dealing with them are necessarily somewhat different, and second, because the authority under which they are dealt with is different. The status of neglected and dependent children is a matter within the exclusive jurisdiction of the Provincial Legislature, whereas a child who offends against the criminal law can be dealt with only under a Dominion Act.

For dealing with neglected and dependent children the Children's Protection Act of Ontario provides an admirable system. I do not know of its equal elsewhere. Briefly put, it seeks to provide a good domestic home for every child whose home surroundings are not what they should be. Every effort is made to improve the natural home, and where that proves impracticable, and only then,

the children are removed under an order of the Court and placed in good foster homes. In the time that the Act has been in force some seven thousand children have been thus transplanted, and of these it has been calculated that more than 98 per cent. have grown up, or are growing up, well. There have been less than 2 per cent. of failures. And these seven thousand are only the children actually taken. A larger, probably a much larger, number have been saved in their own homes by improving the home conditions. What an army of future criminals has not this work transformed into good citizens!

But the experience of sixteen years has shown the Act to have certain defects, the time to remedy which has, I submit, arrived—defects which must be remedied if the great work is to be properly and adequately developed.

The present Act does not make sufficient provision for the financial support of the work locally. Too much is left to voluntary effort and too great a tax is put on those who are willingly giving of their time and effort and money in aid of the cause. When the Act was first adopted it was thought that the local societies would be generously endowed by wealthy persons in the several localities. That this has not been so is spoken of by Mr. Kelso as one of the disappointments of the work. It was also expected that the local municipalities would very largely take over the local support of the work. Experience has, however, proved that in at least the majority of cases the municipalities cannot be relied on to afford anything like adequate support. It is surely time for the Legislature to recognize that these are the conditions and that other means must be provided; for the present system places very serious limitations on the work. In the first place, speaking broadly, the work is done only in those places where there happen to be persons willing to voluntarily undertake it. In most of these places, moreover, it is done in a desultory, haphazard manner and by no means thoroughly and systematically as it should be. In the large town of Pembroke, for instance, where there is crying need for it there is no society and nothing is being done. In the newer portions of Ontario there are plenty of neglected children, and they should also be looked after. Really good and systematic work is being done only where a paid official is devoting all his time to it, and in larger cities one paid official is not enough. It should be recognized that this is so and adequate provision made in that regard. In most cases where salaries are paid they are very inadequate and this makes it difficult to secure the best men available. There is bound to be a difficulty with regard to the collection of funds. The agent naturally does not wish to take a prominent part in collecting. It is too like begging for himself. The result is that those people —very often busy men and women—who are already devoting time and thought to the work of saving the children must devote a still greater amount of time to the unpleasant duty of collecting subscriptions—and usually with very indifferent success. I do not of course mean to maintain that voluntary subscriptions should be abandoned as a source of revenue. To aid the work financially is a privilege which should not be taken away, especially in the case of those whom time will not permit to help in other ways. Soliciting subscriptions, moreover, makes the work better known. But what I do maintain is that the payment of adequate salaries to agents makes entirely too great a demand—a very unfair demand on that source. It is not practicable to work in that way, nor is it fair to expect it. Collectors are frequently met with this argument: "This is a public work you are collecting for.

Why doesn't the Government or the municipality maintain it? I pay my taxes; that is all that can reasonably be expected of me." The difficulty is in many cases met to some extent at least by the Department giving employment to these agents from time to time in the way of visiting children in foster-homes. This is unsatisfactory in many ways. For one thing it takes the agent away from his own locality perhaps for weeks at a time, and during his absence the local work must perforce be at more or less of a standstill. It does not meet the difficulty fairly and squarely. The present system will never be anything but unsatisfactory.

There is one way, and only one, of rendering it satisfactory, and that is by making provision for the appointment of at least one agent in every county and district in the province and for the payment to him of an adequate salary. This would give permanence to the work and would ensure its being carried on systematically throughout the province. Far from resulting in lessening voluntary effort, it would greatly increase it. Part of the agent's duty would naturally be the arousing and fostering of public interest in the work and I venture to say that as a result there would soon be scarcely a locality in the province without an active and flourishing society.

Turning to the work with delinquents as such, we find our needs to be still greater. There is no use disguising the fact, we are at present far behind the age. We talk of our Juvenile Courts, but we have in fact no Juvenile Courts in the modern sense. We have separate sittings of our Criminal Courts for the trials of juvenile offenders, but those are not Juvenile Courts in the true sense. Probation, the essential element of the true Juvenile Court, is wanting. Outside of the City of Ottawa the law does not provide for adequate probation in Ontario. There is the less excuse for this when it is remembered that the Juvenile Delinquents Act may be at once proclaimed in any place where facilities are provided for its proper enforcement. This Act has for some time been in force throughout the Province of Manitoba. It is before long to be put in force throughout the Province of Quebec, where the Provincial Government has undertaken to provide probation officers and detention homes at the expense of the province. It is shortly to be put in force in Prince Edward Island and probably in the three most western provinces also. Probation has been in force in England since the 1st of January, 1907; it is also in force in about thirty states of the American Union, in Germany, in Sweden, in parts of Austria and Italy, in Australia and in many other countries. In fact it is rapidly spreading all over the civilized world. It is therefore time for Ontario to bestir herself. It will not do for this province, which has been for so long in the van with respect to child rescue work, which was the first jurisdiction to establish what were then known as Juvenile Courts, to continue longer in the rear with regard to the work with delinquents. The Dominion Government has indicated in an Order-in-Council the conditions which must be provided in any locality before the Juvenile Delinquents Act will be proclaimed there, and they are five in number:—

1. That a proper detention home has been established, and will be maintained for the temporary confinement of juvenile delinquents, or of children charged with delinquency. The institution should be conducted more like a family home than like a penal institution, and must not be under the same roof as, or in the immediate

vicinity of any police station, gaol, lock-up, or other place in which adults are or may be imprisoned. (See Section 11.)

2. That an industrial school, as defined by clause (h) of section 2 of the Act, exists, to which juvenile delinquents may be committed.

3. That there is a Superior Court, or County Court, Judge or Justice, having jurisdiction in the city, town, or other portion of a province in which it is sought to have the Act put in force, willing to act as Juvenile Court Judge, and that the remuneration of such Juvenile Court Judge (if any) has been provided for without recourse to the Federal authorities.

4. That remuneration for an adequate staff of probation officers has been provided by municipal grant, public subscription or otherwise. (See Sections 25, 26, 27 and 28 of the Act.)

5. That some society or committee is ready and willing to act as the Juvenile Court Committee. (See Sections 23 and 24 of the Act.)

Of these only one (but that the most important), the providing of probation officers, presents any difficulty. We have already industrial schools, and moreover they are intended under the Act as no more than a last resort in otherwise hopeless cases, so that no child may go, as many do now, to gaol or penitentiary. A Juvenile Court Judge should be carefully selected; but the only practicable course in all but the largest places will be to select from among the judges and magistrates available in the locality the one best fitted for the work and designate him Juvenile Court Judge. All that is necessary is a legislative provision enabling the Government to do this. There is already provision for the appointment of special magistrates for children's cases. I may mention that in Ottawa our two magistrates have been designated Juvenile Court Judges, and one of them, Mr. Askwith, who has by arrangement between them been specially charged with the work, is making an exceptional success of it. The Juvenile Court Committee will obviously be the committee of the local Children's Aid Society. There is already provision requiring the municipalities to provide detention homes. This has been largely disregarded; but were the Juvenile Delinquents Act in force this could not be, as severe penalties are provided in the case of anyone confining a child in an adult penal institution. Complying with the Act would entail comparatively little expense. Where there is a children's shelter it should naturally be used also as a detention home, as is now done in Toronto and elsewhere. In the smaller places an arrangement with some suitable married man without children of his own for the use of his own home as a detention home is all that is necessary. The providing of probation officers, which, as I have said, is the most essential requirement, is the most formidable difficulty; but this would be largely covered by the adoption of the suggestion I have already made for the appointment of a paid agent in every county. In most of the counties this agent would also act as probation officer and he would probably act in every case as chief probation officer when additional officers were needed. In Ottawa, where probation has now been in actual operation for over three years, our paid agent, Mr. Keane, is also chief probation officer, but is assisted in this by two lady probation officers who devote all their time to the work. We have also a special constable who, with his wife, is in charge of our detention home. With this staff we get along fairly well, although the time of all is fully occupied. Mr. Keane and the constable are paid by the city, and the salaries of the two lady

probation officers are paid out of voluntary subscriptions. This puts a very heavy and, I submit, unfair tax on those who have to solicit subscriptions. Provision should, as I say, be made for the payment of an adequate staff of probation officers out of the public funds. A strong argument in favour of such a course is to be found in the truancy question. It is generally recognized that the problem of how to deal with truancy has not as yet been solved. The solution—the only solution, as I believe—is to be found in probation. You cannot cope successfully with truancy either by fining the parents or by punishing the children. Personal influence is your only successful weapon. We have in Ottawa been so successful in this field that many school principals tell us we have solved the truancy problem.

The question naturally arises as to how these children's agents and probation officers should be appointed and paid. These are details; but I would suggest the following arrangement: Let them be appointed by the local Children's Aid Society (where there is one), subject to the approval of the Superintendent of Neglected and Dependent Children; or, where there is no Society, by the Superintendent. Let the salaries be fixed by Order-in-Council and be paid by the province and half by the municipalities.

Now let me repeat, in a few words, the legislative provisions which, I submit, are essential at the present juncture if our child rescue work is to be carried on in an efficient manner:—

1. Provision for the appointment and payment out of the public funds of at least one children's agent in each county who should also be probation officer or chief probation officer for the county; and of additional probation officers and other assistants wherever necessary. The mode of appointment and payment might be as already suggested.

2. Provision establishing juvenile courts within the meaning of the Juvenile Delinquents Act and empowering the Attorney-General to designate some judge or magistrate in each county as juvenile court judge.

3. The putting in force of the Juvenile Delinquents Act throughout the Province of Ontario.

There are, of course, many other needs on which I might enlarge, but some of which I shall content myself with briefly mentioning:—

4. We need much more extensive facilities for dealing with children who are mentally defective. A large proportion of the delinquents are in this condition and they ought to be within an institution. This is especially true of older girls. The neglect of them is conveying the problem into another generation. Our one present institution is usually crowded to the doors.

5. We need a provision forbidding children to attend a theatrical performance unless in charge of a grown-up person. This was recommended by a committee of the House some years ago and I cannot imagine why the recommendation was never carried out.

6. We need provision for the inspection of all moving picture films before they are exhibited to the public, and the elimination of those that are objectionable. The cheap theatres are a most serious evil for the children, and if they cannot be banished they should at least be regulated and the children, moreover, kept away as much as possible.

7. We need a provision placing children who are regularly adopted by foster-parents in the same position as actual children as regards inheritance of property. Many people dislike making a will and cruel disappointment and injustice often thereby results to those whom they looked on as their own children.

Doubtless many other needs might be suggested; but demands if too wide are apt to be difficult to secure. Those I have numbered one, two and three I look on as essential at the present time, and I wish to urge not only all who are interested in children but all who wish to reduce the criminal population to unite in pressing them upon the Legislature. We have our state-paid agents in every corner of the province to protect the trout and the grouse and the deer. Are these more valuable than the children? We have our Government agents by the score studying how best to promote and protect the crops. Our greatest and most important crop is our children. We groan under the growing expense of capturing, prosecuting, housing and feeding our ever-growing army of criminals. There is one way, and one way only, of dealing with the crime problem, and that is to deal sensibly with the children. Not only is this demanded on humanitarian grounds. It is dictated by economy. A dollar spent on saving children will save many hundreds of dollars later on. The neglected and dependent and delinquent children of to-day are the adult criminals of to-morrow in the making. In the republic to the south of us, where the juvenile court idea has of recent years been wonderfully developing and spreading, they have chosen a motto for the Court, and with that motto I will close: "It is wiser and less expensive to save children than to punish criminals."

CHILDREN IN FOSTER-HOMES.

A Talk with Those who Undertake the Care and Training of a Child.

By Mrs. L. J. Harvie, Toronto.

Among the most priceless treasures of a nation are its children. If the family life is pure and good, the surroundings healthful and happy, the children growing up to manhood and womanhood subject to these conditions are one of the most important and valuable factors in the development of a sound and vigorous national life. The training of the children of any nation in the knowledge of God, in habits of industry, thrift, honesty, truth and endurance ensure to that nation almost invariably the wealth which results from commerce, manufactures, well-tilled fields, the arts and sciences, etc. The writer once heard a Canadian statesman say, in speaking of the work of child-saving, that even one boy or girl rescued from a degraded environment and trained to good citizenship, was worth many thousands of dollars to the community.

With this thought of saving the children of the Province from neglect and degeneracy in view, the Department for Neglected and Dependent Children, with its branch Children's Aid Societies, was established about fifteen years ago, with the approval and under the special direction of the Ontario Government.

The primary object of the Children's Aid Society is to secure for each child of the locality where it is organized, a suitable home and a desirable environment, where the child nature may develop to at least average health, mentality and morality. Many children are growing up in our midst without any brightness, buoyancy, or laughter in their lives. They do not even know how to play—the innocent gaiety natural to childhood is absent, sometimes it is only dwarfed, more frequently it is dead—killed in the struggle with its degraded, miserable, wretched surroundings. Therefore, the first work of the Society is, if possible, the improvement of the child's own home by raising the tone of the family life, in whatever way this can best be accomplished.

Where this purifying of the family life is impossible after a reasonable trial, the machinery of the law is invoked, and in accordance with the provisions of the Ontario Children's Protection Act, the guardianship of the suffering child, or children, can be transferred from such careless or immoral parents to the local Children's Aid Society.

During the past fifteen years, many hundreds of neglected children have been handed over to this supervision and guardianship. These children have been carefully and judiciously studied as to temperament, disposition, attainments, etc., and eventually placed in foster-homes throughout the country. The number of foster-homes now under supervision is probably about 3,500. When it is said that there are no better homes in the country than those whose doors have been opened to our children, the writer speaks from an experimental knowledge of these homes,

their conditions and surroundings. In view of this personal familiarity with our Canadian foster-homes, this pamphlet has been prepared expressly for the purpose of encouraging the noble men and women who, as foster-parents, are striving, often through difficulties, and the exercise of a remarkable degree of patience, to train the children in their care, in order that they may grow to be good men and women. Additionally, the thought in the writer's mind was to offer a few suggestions which might prove helpful or inspiring in discouraged moments or give new light as to methods whereby hoped for results might be obtained and the ultimate object of all child-saving work secured. We shall arrange these suggestions under the headings "Do," and "Do Not," supposing that in this way the various points may be more easily remembered:

Do.

Do remember that in taking a child you assume the obligations of a *foster-parent* or parents, and by the act of accepting it and welcoming it to your home you promise to *care for it as your own.*

Do remember to bestow upon the child taken into your home a certain amount of affection. Perhaps the hardest heart in the world can be touched by an expression of love and sympathy. Do remember that the heart of the child is especially susceptible in this direction, and a real affection, judiciously manifested, will work wonders in almost any child nature.

Do remember to appreciate and commend, where possible, any duty creditably performed or service rendered by the child. Children are very human, and usually ambitious, and commendation will in nine cases out of ten incite to further effort.

Do remember that your child requires a certain amount of education in order to get on in the world, and do be ever on the alert to encourage and assist in its desire for knowledge.

Do remember that ability to ask questions is not a fault but a virtue, and, where rightly guided and heartily responded to as opportunity offers, is an open door to knowledge of various kinds.

Do remember to correct bad habits and foster good qualities. Let it be line upon line and precept upon precept in this regard.

Do remember to cultivate the moral and religious nature of the child.

Do remember to take it *with you* to some place of worship and to send it to Sunday School, also to encourage the study of God's Word *in the home.*

Do remember to teach the child to be reverent, obedient, truthful and kind, not only to individuals but to animals.

Do remember to set a good example before the child. Children are close observers, and they soon discover whether or *not* the lives of their parents conform to their teachings.

Do remember to punish your child if it requires it; but do so discreetly and kindly. Children usually have a fairly true sense of equity, and an unjust or unnecessarily cruel punishment rankles in the mind for days, even weeks. Almost all children (there are some exceptions, of course) can be ruled more easily by love than by severity.

Do remember the Golden Rule in dealing with your child.

Do remember to seek Divine guidance and blessing in seeking to train your child.

DO NOT.

Do not ask for a child from the Children's Aid Society unless you really want one, and have a craving for the presence of young life.

Do not ask for a child if you only *want a servant.* You have probably needed help in the household, and have asked for a child to do chores, run errands, and do light work. By this means you may have secured *temporary* help; but in the end it is only the help of a *servant.* On the other hand, if you have taken the child to deal with it as *your own,* to bestow upon it true affection, to give it an education suitable to your position in life, to train it in honesty, truthfulness and industry, you will have in days to come a son or a daughter, as the case may be, to comfort you in declining years or to become the mainstay of the home.

Do not keep a child at work when it should be in bed or doing its home study work or enjoying recreation of some kind.

Do not forget that the ordinary child craves companionship with those of its own age and act accordingly.

Do not neglect signs of illness in the child; but consult a physician or give some simple remedy immediately.

Do not complain of the child's bad conduct to others in its presence. Correct or admonish it when alone. In this way you will increase the affection and respect with which you are naturally regarded.

Do not talk about your child's faults or bad habits to your neighbors. The child is doubtless to be pitied, because in the past it has had such a poor chance in life.

Do not deprive your child of comfortable or suitable clothing. Boys, perhaps, are not so desirous of nice clothing as girls, nevertheless all should be dressed comfortably, according to the station in life of foster-parents. Do not think it necessary, in order to prevent vanity in the wearer, that the clothing should be old-fashioned or out of date as to style.

Do not keep the child from school upon any or every slight pretext.

Do not submit your child to a process of "nagging" or continual scolding. If it disobeys, or does the work appointed in a careless or slovenly way, correct kindly but firmly and then let the matter drop.

Do not despise the "confidences" of the child, but rejoice when it comes to you with its ideas, opinions and longings.

Do not leave a young girl alone in the house for any length of time. Always arrange that some responsible person shall be within sight or call. Attention to this suggestion would prevent, in many cases, much trouble and sorrow.

Do not forget to notify Secretary or Superintendent of Department if there is a change of your address; or if circumstances make it necessary to return your child.

The above is but an outline which may be filled up almost *ad infinitum* by any sensible person who has *at heart a real love for humanity* or a desire to help a nameless, friendless child to a worthy and useful life.

Friends of the work of child-saving reading this and desiring further information are invited to correspond with Mr. J. J. Kelso, the Superintendent of the Department for Neglected and Dependent Children, Parliament Buildings, Toronto.

Children's Fresh Air Fund.

City children starting on a two weeks' vacation in the country.

ORPHANAGE STATISTICS.

An interesting calculation was recently made on the relative and absolute increase in the number of children maintained in the orphanages of Ontario during the past twenty years. The figures, as supplied by Government Reports, are as follows:—

Total number of children cared for in 1888.....	3,452
Total number of children cared for in 1908.....	4,718
Increase	1,266
Number of children in orphanages, Sept. 30th, 1888..	1,747
Number in orphanages, Sept. 30th, 1908.....	2,168
Increase	421
Government grant for 1888.....	$16,453.69
Government grant for 1908.....	17,388.05
Increase	$934.36
Total cost for maintenance, 1888	$123,943.04
Total cost for maintenance, 1908.....	157,592.01
Increase	$33,648.97

That is to say, there are about 400 more children in the orphanages of Ontario to-day than there were twenty years ago. In the first period the relative proportion of the number of children in our orphanages to the total population of the province was practically 1 to each 1,000 of population. On account of the increase of population the proportion is the same to-day. The increase in cost of maintenance is a good deal, but probably not any more than the general increase in the cost of living between the two periods would explain.

The orphanage population in Ontario and the cost for their maintenance could be reduced one-half if a determined effort were made to force parents who were able to do so to maintain their own children, and place in foster-homes those children whose own homes are so bad that they cannot with safety to the community be returned to their parents. While a reduction in the number of children now in orphanages would reduce the cost to the charitable public it would be of infinitely more value to the community and to the children themselves by giving them the ordinary surroundings of home life and better fitting them for contact with the world when the time came for them to be thrown upon their own resources and showing of what material they were made.

DEFECTIVE AND DELINQUENT CHILDREN.

The following are Provincial Institutions caring for the defective and delinquent:—

The Feeble-Minded.

The Ontario Institution for the Feeble-Minded is located at Orillia, Ontario. Dr A. H. Beaton, Superintendent.

Education of the Blind.

The Ontario Institution for the Education of the Blind is at Brantford, Ontario. Mr. H. F. Gardiner, Superintendent.

Deaf and Dumb Institute.

The Ontario Institution for the Deaf and Dumb is situated at Belleville. Ontario. Dr. C. D. Coughlin, Superintendent.

Industrial Schools.

The Victoria Industrial School, located at Mimico, Ontario, about six miles from Toronto, is intended for the industrial training of wayward boys under sixteen years of age. Mr. C. Ferrier, Superintendent.

The St. John's Industrial School for Catholic boys is located at East Toronto, about three miles from the City. Brother Abnis, Superintendent.

The Alexandra Industrial School, located at East Toronto, three miles from the City, is for the training of wayward girls under sixteen years of age. Miss J. Parrott, Superintendent.

The St. Mary's Industrial School for Catholic girls is located on West Lodge Avenue, Toronto.

BRITISH PREMIER ON CHILD PROTECTION.

It is interesting to know that the Premier of Great Britain, the Right. Hon. H. H. Asquith, has always been an ardent supporter of children's aid work. Some years ago, when Home Secretary in a former administration, he delivered a memorable address, from which the following extracts are taken:

"The safeguards which democratic institutions, the freedom of the press, the right of public meeting, etc., afford, do not exist in the case of the suffering children. The children are, from the very necessities of the case, a dumb and a helpless class. They cannot organize themselves into unions; they have no votes which can influence parliamentary elections; they cannot conduct agitations; they cannot even march in procession with bands and banners.

"The great difficulty which the police have to encounter with relation to offences against children is the difficulty of obtaining authentic information. When you consider the position of a small child which has been a victim of daily outrage and abuse, when you consider its position as between itself and its natural protectors and guardians, you can easily understand how insuperable are the obstacles which are placed in the way of the most effective police force in the world in discovering and punishing crimes in connection with children. If, on the other hand, you have an active and intelligent officer, working under the supervision of a body of humane and philanthropic men and women, who is looked upon by the people, and by the children, not as a member of the police, but as a friend of their own, you will find that the information which would be denied naturally to a minister of the law acting in an official capacity, and as the representative of public order, is readily and freely given with the best possible result in the interests of all persons concerned.

"It is often the object, as experience shows, of brutal parents, if they possibly can do so, to shuffle off all responsibility and all obligation for the care of their children; if they can once get them into a great State-aided institution their object is attained. They can wash their hands of the matter and they are perfectly happy. It is most important, both in the interests of the parent and the child, that, as far as possible, we should strengthen and give all the sanction we can to the sense of parental responsibility. Wherever a case is proved in which the child is thrown, by the neglect or by the ill-treatment of its parents, upon the public charge, the State should have a right, which it ought unflinchingly to enforce, to come upon the parents and to get from them, in the form of punishment or pecuniary indemnity, some return for the charge which they have thrown upon the community.

"If men and women were to go down by the side of the Thames, cast their little infants into its waters, and these were to be carried backward and forward by

the ebb and flow of the tide, the whole of England would be roused to indignation, and a society would be formed, which would embrace the whole of the population, or nearly the whole of the population, of the country, in order to deal with such iniquities. But have we not crime going on quite as terrible as casting a number of infants into the waters of the Thames? Have we not children destroyed in the very earliest days of their life? and have we not systems whereby as they grow older they can be conveniently destroyed? Have we not unnatural baby-farmers and baby-hawkers, who make their livelihood out of the misery of the children they carry about—not necessarily their own children, but children they hire for the purpose, much as an Italian hires an organ in order to attract attention and to be paid to pass on?

"The child has as strong a right to its existence—the child of a day old—as the man who has reached his fiftieth year.

"I have met myself in more than one town some of the best people, who, speaking, thought there was no need, in that particular town at all events, of a society of this kind, for among their population children were treated with every amount of respect by their parents. The Society, in spite of these objections, wherever it has been planted, has reaped at once an abundant harvest. Things have come to light which no persons in the locality dreamed of existing, and the populations in these towns have been brought together and combined together in order to protect human life, and to save little children from those cruelties which come to them as a revelation."

"We in this country flatter ourselves that we have always been peculiarly susceptible to appeals made to us on the part of helpless and oppressed peoples and classes. We have denounced upon a thousand platforms the despotisms which have prevailed in the East, or in other parts of the world, and we have vindicated in the most eloquent perorations the rights of oppressed nationalities. We have been famous in days gone by for our part in that great modern crusade—I mean the struggle to put down the slave trade and slavery—and I think there are abundant signs around us at the present moment that the zeal of Englishmen has not abated. We have been the first among all people in the world to recognize the rights of dumb animals, and to secure by voluntary action, and by legislative enactment, protection for them against cruelty and abuse. I ask you, of all these great and worthy causes, is there a single one, in point either of the directness with which it comes home to our hearts, or in point of the demand which it makes upon us for effective individual action, which does not fade into insignificance by the side of the cause which is presented to you to-night? The little children of England, voiceless, helpless, defenceless, stretch out their hands to you. Is there a man, is there a woman, who can turn away from such an appeal?"

THE SOCIAL PROBLEM IN ENGLAND.

WHEN Dr. J. A. Macdonald, editor of The Globe, visited England recently, he was greatly struck by the wretchedness and misery prevailing among the poor, and the lesson is needed in Canada as showing the social dangers that should constantly be guarded against. The following paragraphs from one of his articles are worth pondering:

"The social problem everywhere is appalling, almost to the point of despair. Wherever we went it forced itself upon us. The least dangerous aspect of it was that hollow-eyed procession of the homeless of London kept moving along the pavements by the police in the early dawn, waiting for the opening of the soup-kitchens. London, Sheffield, Manchester, Glasgow, Edinburgh—each had its distinctive features, but everywhere the marks were deep of disease and degeneracy in body and mind and morals.

"At the heart of the wretchedness of the British slum is the drunkenness of the people. To the Canadian nothing is more shocking than a look into a typical public-house. And the children! While they are yet infants they are doomed to drink and crime. One despairs even of them, so scarred and ingrained are their natures with the diseased conditions which destroy alike nerve, and brain, and blood. Some social reformers talk of Canada as the hope of the slum children. It offers at least a chance.

"But Britain must do something more with her social problem than to go on multiplying the unfit and transporting them to the overseas dominions. The open country and the cleaner social conditions of Canada may redeem a few, but why not try the open country of Britain itself? One sees millions of acres of untilled land in England and Scotland, the unused areas of great estates. Why not reclaim that land from the pheasants and the deer?

"And why should the public-house and the brewery go on dominating the legislation and the social institutions of a free people? In the 'historic mile' of Edinburgh, between the Castle and Holyrood, there are more liquor-selling places than in the whole city of Toronto. And Edinburgh is not worse than Glasgow or the large cities of England. How long will a great nation go on breeding weaklings and criminals? How long will such a nation remain great? And how long will it be counted safe for Canada to admit the human output of Britain's drink-cursed slums?"

THE DANGERS OF INSTITUTIONAL LIFE.

By R. R. Reeder, Ph.D.

The natural home of the child is the family; the natural environment of the family is the country. Any departure from these conditions is fraught with danger and loss to the child. Institutions are usually located in cities, and the family influence and spirit are wanting; they therefore offer little that is attractive to children.

Wholesome and attractive food, freedom and room for play, comradeship of other children and of older people, individual obedience, opportunity to learn and to render helpful service, sum up the conditions of a happy childhood.

Individual range and freedom are usually in inverse ratio to the mass. Two or three persons may appear a a ticket-office window and be served informally, but a dozen or more must "get in line." A few passers-by may stop to observe workmen in the street, but a crowd must "move on." No one objects to the occasional observance of such regulative measures, but they would become extremely monotonous, not to say irksome, if we were obliged to conform to them in most of the every-day experiences of life. To "line up" in order to wash one's face and hands, to "line up" to go into the dining-room, to "line up" for chapel, for church, for prayers and for bed, reduces life to a mechanical round, which to the child is anything but a merry-go-round. But to all such requirements the institutional child conforms, and in them suffers. He may not know he suffers, for these endless line-ups gradually wear grooves in the brain, and he locksteps and repeats with the apparent ease and precision of a little automaton.

In large institutions for children these great uniform manœuvres often constitute the show features of the place. 'Have you seen our children come in to dinner?" "Oh, you must see the children come in to dinner!" These and similar references were repeated to the writer by different members of the staff while visiting an institution not long ago. Although we had finished our visit an hour before this parade was to take place, we were persuaded to remain over to see it. At the appointed time we were ushered into the large dining-room where all was in readiness; a musician took her place at the piano, the large double doors were swung open and the children, four abreast with heads in a descending plane, marched forward with the precision of young cadets to the inspiring measures of the instrument.

Inspiring? Why not? Is there anything incongruous between the term and a performance repeated three times a day, three hundred and sixty-five days a year? Just get into the line yourself or put your boy into the line and answer the question to your satisfaction. The discipline that makes a good soldier or a good mechanic is dreary monotony to the growing child. It may be great fun for him to play soldier when he *wants* to, but to *live* soldier, whether he wants to or not, is soul-shrivelling slavery. A plaster cast may be necessary to hold in place a fractured bone, but, worn permanently on a sound limb, will painfully interfere with circulation and growth.

The superficial observer looks upon the "line-up" manœuvres of children in an institution as marks or exhibitions of obedience, and, as such, possessing great virtue. Obedience is the most fundamental and essential quality of human character. But the most important element in obedience is conscious subjection of the will. The soldier subjects himself to the discipline of army life. He chooses to be a soldier. But the child has no choice about it, and since most of his movements in the institution home are controlled by forms or molds shaped for him by others and let down from above, there is little opportunity left for the exercise of free will or choice. Hence, obedience is not a large factor, to say the least, in all such manœuvres. A child may have gone through the line-up process of bathing twice a week for ten years, and yet never learned to take

a bath—in fact, never have taken a bath, for taking a bath involves a good deal more than the application of soap and water. It means desire, will and choice before the soap and water are in sight. With these the institution child usually has nothing to do. But this is true of almost all the activities of children in institutions. The absence of will-training, of the opportunity to exercise free choice, is therefore the first great danger from which children in institutions suffer. To learn to choose is the most important activity of the child, and the only way to learn to choose is by choosing under proper instruction and guidance, and with frequent opportunity to choose wrong as well as right.

Was It Worth Eating.

But, after all the above-mentioned flourish to get into the dining-room, what did the children have to eat? Was the game worth the flame? In this case the visitor would have been more interested—and so doubtless would the children—if the menu had been more of a feature, and the march less, in the daily life of the institution. Here we come to the second great danger to child life in institutions namely, lack of variety and quality in the children's dietary.

The institution child is the victim of a pernicious economy in expenditure for food supplies, of inferior brands of foodstuffs and of indifferent and easy-going cooks who think anything will do for a lot of children. In an institution of two or three hundred children it is an easy matter to reduce the per capita allowance of milk, meat or other necessary articles of food supplies; or to change to inferior brands of foodstuffs for a reason and thus save a considerable sum, without any one's knowing it outside the administration and the mute, innocent victims of such a vicious economy.

In league with this false economy of administration are the grocer, the butcher and the baker, who want the institution trade and are obliged to secure it by competitive bids. This system has developed institution grades of various foodstuffs—beans that are rusty, wormy and unsorted; molasses that will tarnish a silver spoon, thickened with pumice-stone powder; stale oatmeal poorly screened and infested with weevils; tea that reminds one of musty hay, and prunes with a thick skin stretched over large pits.

Wholesale Cooking.

The institution kitchen is not a place where the art of cooking may be studied to advantage. The monotony and bulk of the menu day after day and week after week offer little inducement for the exercise of artistic skill even if the cooks were ambitious to acquire or display it. Quantity and despatch, not quality, is the matter of chief concern. Little effort is made to make the food really palatable and attractive. Some time ago the children in one of our cottages expressed a decided distaste for hash. When the next cooking lesson was given in that cottage the efforts of the class were concentrated on the making of a good hash. The meat was chopped fine, gristle parts and bone removed, and the whole brought to a rich, tempting brown, seasoned to taste and served hot with an odor that was irresistible. All enjoyed hash at that supper.

Usually in institution dietaries there is too much to drink and too little to eat. Tea, coffee, cocoa, milk, soup, etc., cost less, fill up more, and are less trouble to serve than solid food. Tea, bread and cheese was the supper I saw served recently in an institution for little children. The result of such dietary is ill-nourished, undersized, pasty-looking children.

Military precision and routine in his ordinary daily tasks, and an impoverished dietary, are but little less injurious to the child than restricted play, which is the third great danger to the institution child.

There Should Be Organized Play.

The essential elements of play are freedom, richness of content, success and range. In all of these the play of institution children is lacking. There can not be freedom in play where the play space is so narrow that individual or group plays cannot be

An Unsatisfactory Interior.

Conditions the Children's Aid Society seeks to improve.

carried on without constant interference from other children not in the game—or who may be otherwise-minded for the time being. But this is usually the situation in congregate institutions—especially if located in the city. Occasionally one may be found with not a square foot of outdoor playground.

Such a situation is pitiful. Under such restrictions children are forced to resort to forms of play that are without content except mere bodily exercise, like tag, sliding-down-a-board, jumping, etc. Such plays are empty; there is no richness of content, sustained interest or culture in them as there is in games, playing house, or other forms of amusement in which the imagination is exercised or the dramatic quality predominates. In such barrenness also there is neither achievement nor range. In his play experience the child should be encouraged to undertake things, and be given aid in the various schemes and enterprises he projects.

The child that is constantly disappointed in his play enterprises, making a failure of his cherished play dreams day after day, receiving no sympathy from those responsible for his welfare and no help in overcoming obstacles too great for him, soon loses confidence in himself; the spirit of venture dies out and he falls into the habit of making a failure of what he undertakes, and thus prepares the way for abortive efforts in the more serious ventures of later life. To succeed in building snow forts, in making kites, sleds and wagons, in coasting the hill, in skating, swimming, and climbing trees, in dressing dolls and training pets—all such achievements prophesy success in the important endeavors of later life. The culture power of the adult is measured by the play experience of the child. The boy is father to the man.

Lack of Industrial Training.

The fourth charge against institution life which constitutes a danger to the child is lack of industrial training. It is as important that the child should work as that he should play. Child idleness is a greater menace to society than child labor. Probably ten children go wrong or suffer through idleness to every one injured by too much or too constant work.

To legislate children out of employment, which dwarfs the body and stupefies the mind without at the same time providing by just as vigorous means employment which develops the body, stimulates and enlightens the mind, is to augment the greater evil; for thousands suffer from idleness where hundreds suffer from labor.

Something more than obedience, physical comfort, play and school attendance are needed for the proper development of the child. That which bears most directly upon the problem of self-support is industrial and economic training. Such training must come early. The best school for industrial education is the school of experience, and the only proper method of instruction is the method of experience. The problem then is how to give the child an industrial and economic experience which will develop in him efficiency and self-reliance.

This problem, institutions for children have scarcely touched. The result is a situation described to me by a trustee of a well-known orphan asylum: "The notable characteristics of our girls who go out from sixteen to eighteen, and the boys at fourteen, are timidity and disinclination to work, lack of self-reliance and apparently utter inability to take the initiative in anything, or to assume responsibility, and an absence of any aversion to charity." All we can say of such work is that it is a failure. Industrial efficiency and economic training in earning, saving, spending and giving money are an unknown experience in the institution life of the child.

Seeking Children as Servants.

The dominant interest of society in this age is the economic interest. As soon as the dependent child is sent forth he becomes the victim of this consuming passion of

the times. Unless he has had special training to protect him from being exploited for economic ends, he will be little better than a slave in the family he serves. Following is an extract from an institution boy's letter:

"I was placed out with a farmer in Nebraska and worked for him about seven years, expecting to get something when I became of age, but got nothing. I then went to work for another farmer and had a pretty hard time until last year, and now I am getting a start."

I recently talked with a young woman twenty-four years of age who told me she was placed out at thirteen with a family in which she served until twenty-two years of age. She received neither wages nor schooling until eighteen years of age, after which she received five dollars a month until she left at twenty-two. Thousands of orphan boys and girls whose early years were passed in institutions have thus become the easy prey of tight-fisted farmers or other employers of children who want a sixteen-year-old child to do a man's or woman's work for board and clothes. To send the child into the world without a training which safeguards him against exploitation—industrial, social and economic—is simply to offer him as a slave to greed.

Variety of Companionship.

The fifth and last great danger to the children of the institution home is the lack of association and companionship with older people. The institution child is inexpressibly lonely. Superficial observers who see great groups of such children together may think it impossible for a child to be lonely; but the feeling is there just the same, and it is keenly felt. Every child wants to be owned; wants to be somebody's child; wants to hear "my boy" or "my girl," papa's girl" or "mama's boy," from loving lips. Think of the soul-hunger and desolation of such little lives when individually lost in the mass or group—often hearing only the last name spoken, and with never a kiss or caress from dawn to eve, and you will not be surprised at the readiness of institution children to place their little hands in any open palm that offers, or to bestow the affections of their little starved hearts upon any one, even though he be a veritable old tramp who says he is their uncle. It is sympathetic personality for which the child yearns.

To meet this deepest need of the child heart and life, institutions—especially large ones—have nothing to offer. The creature comforts—food, clothing and shelter—may all be well provided, but this higher need is not met. In smaller groups with a greater proportion of adults to children, with brothers and sisters in daily intercourse, the older looking after the younger, and with all the home interests and industries in which the children share and serve, there may be created a home-like atmosphere in which a measure of family pride, spirit and affection is realized. The cottage system makes this possible, provided the matrons, teachers, assistants, etc., are people who love child life, who can work, play and fellowship with children naturally, joyously and without condescension.

Daily association and companionship with a strong, sympathetic character is a brief but comprehensive description of a happy condition of child life. The child that has such a heritage for his early years needs little else, and he that lacks it will be little the better off for anything else he may have.

The recent conference on the care of dependent children which met in Washington at the call of ex-President Roosevelt, and which will, no doubt, result in the establishment of a Federal Children's Bureau, has struck a new chord in the grand chorus of voices raised in behalf of the nation's children. Of all the conferences called for the purpose of conserving our national resources this has touched the highest level, for it includes that vital asset—child life, the embryo of the future of this great nation.

The knell of the old-time orphan asylum was sounded in this conference. Scores of these ancient institutions are still in existence, snugly tucked away in quiet corners, or fenced around in the great cities with high walls, where but little of ths vain world can enter. Will the managers of these institutions and their staffs even *know* that such a conference has been held? They are good people, really good and pious; they believe that they are doing noble work by keeping the poor orphans wrapped up in cotton and oatmeal, while the little ones are pining for life—rich, full, free, natural and individual life. Not to provide for the spontaneous expression of these natural instincts and longings by suitable environment and free activity is simply to shrivel and stupefy their young souls.—*Delineator.*

Looking for a Playground.

CHILDREN'S AID SOCIETIES

The following reports will give some idea of the work carried on by the Children's Aid Societies of the Province:

TORONTO.

J. J. KELSO, Esq.,

Superintendent of Neglected and Dependent Children of Ontario.

DEAR SIR,—I am pleased to respond to your request for the report of our work during the year 1909. It is as follows:

There were 1,621 cases of neglected, dependent and delinquent children came under the notice of this Society, involving the interests of 1,922 children.

The cases coming from the Children's Court were disposed of as follows:

Suspended sentence	703
Fined	270
Discharged and withdrawn	82
To St. Vincent de Paul Society	78
To Victoria Industrial School	56
To Alexandra Industrial School	21
Otherwise disposed of	33
Not disposed of	5
	1,248

Number of complaints, 324 (89 more than last year), involving the interests of 545 children. These were disposed of as follows:

Made wards	37
Assuming custody of children	59
Mediation and advice	64
Warning	77
For discipline	33
Co-operation of other Institutions	32
Lost	12
In abeyance	10
	324

The number of children sent to foster-homes during 1909 was 35.

Since the organization of the Society in 1891, 17,458 cases have come under its supervision, involving the interests of 22,698 children.

In our last report mention was made of the intended opening of our new wing, to give better and improved facilities for the carrying on of our work to meet the natural increase of population of our city, and the abnormal increase caused by the annexation of so many populous suburbs. This wing has now been in use since March last, and is admirably adapted to the work. As will be readily seen, the year's work has been heavy, entailing much thoughtful anxiety and judgment. Before your Annual Report is printed, this Society will have four paid officers looking after the neglected and delinquent children of Toronto, having in view the preventive features of our work as well as attention to the cases that we are daily informed of by 'phone and mail. Besides these, we are greatly helped through the Church organizations and Y.M.C.A. We fully appreciate your valuable help in the visitation of the wards of our Society placed in the numerous foster-homes of our Province, and ask you to accept our best thanks for this and the periodical reports of such visits that we receive now almost daily. We still have difficulty in finding foster-homes for the younger boys in our care.

The cheap 5c. and 10c. shows, or theatres, are on the increase in Toronto, and I regret to say are the cause of many a juvenile delinquent appearing in the Children's Court. Until parents become thoroughly aroused as to their grave responsibility in this matter, I suppose nothing can be done to prevent their children attending these cheap theatres.

Again the Society has to thank the Police Magistrates and all the Court officials for their great assistance so cheerfully given, to aid us in our work. The cordial relations that exist between us and all concerned in children's work make it a pleasure and a delight to do one's duty.

Yours faithfully,

WM. DUNCAN,
Secretary.

The officers are as follows.

President—J. K. Macdonald.

Vice-Presidents—W. Harley Smith, M.D.; T. Millman, M.D.; R. S. Baird, Hon. Thos. Crawford.

Treasurer—A. M. Campbell.

Secretary and Inspector—Wm. Duncan.

Hon. Solicitor—W. B. Raymond.

Committee—C. P. Smith, J. M. Foster, Ambrose Kent, C. J. Copp, M.D.; Noel Marshall, C. C. VanNorman, D. E. Hughes, R. A. Nisbet, A. B. Powell, James M. Sinclair, F. W. Gerald Fitzgerald, Herbert Mortimer, Henry Sutherland, E. J. B. Duncan, Mrs. Wm. Oldright, Mrs. J. J. Follett, Mrs. C. C. VanNorman, Mrs. James Ryrie, Miss Wardrop, Mrs. John Lillie, Mrs. J. C. Fisher, Mrs. F. C. Jarvis, Mrs. A. F. Rutter, Mrs. O. B. Sheppard, Mrs. Ambrose Kent, Mrs. A. E. Dyment, Mrs. C. S. Macdonald, Mrs. W. J. Lovering, Miss Adele Nordheimer, Mrs. James Sargant. Ald. J. O. McCarthy, appointed by the City Council.

ST. VINCENT DE PAUL SOCIETY.

Toronto, January 18th, 1910.

J. J. KELSO, Esq.,
Superintendent of Neglected and Dependent Children of Ontario,
Parliament Buildings.

DEAR SIR,—I hereby forward the annual statement of the work of the St. Vincent de Paul Children's Aid Society of Toronto for year ending December 31st, 1909.

During the term 403 cases were brought to the notice of this Society, affecting the interests of 467 children. Of these cases 275 were from the Children's Court and 128 were private cases reported to the office.

Children's Court Cases.

The list of charges under this head were as follows:

Disorderly conduct	77
Theft	73
Malicious injury to property	14
Truancy	4
Trespass	8
Throwing dangerous missiles	1
Assault	5
Gambling (throwing dice)	11
Breach of City By-laws	34
House Breaking	14
Arson	1
Wounding	4
Vagrancy	27
Indecent assault	2
Total	275

No. males, 264; No. females, 11. Total 275.

His Worship the Police Magistrate disposed of the Court cases as follows:

Committed to St. John's Industrial School	33
Committed to St. Mary's Industrial School	6
Remanded till called on	71
Discharged on suspended sentence after serving shorter terms of restraint in our Shelters	90
Fined	49
Discharged	15
Withdrawn	4
Made wards	7
Total	275

Private Cases.

Notwithstanding the large expansion of the City, we claim that our ever-active preventive work has succeeded in keeping down wrong-doing to the minimum mark, especially of the more serious crimes.

Since the inception of this Society, up to December 31st, 1909 (15 years), there were 4,521 cases, affecting the interests of 6,952 children.

Our Wards.

Our wards now number 161, being an increase of seven during the last year, all of whom are doing well, and many of them excellently.

We desire to acknowledge the helpful assistance afforded our agent by all interested in child-saving work, especially by Municipal and Government officers.

Financial.

Our finances, helped by the services rendered to us by our Charitable Institutions, make us able to meet all reasonable calls upon us in that line.

The Officers and Board of Management, 15th year of the St. Vincent de Paul Children's Aid Society of Toronto, are as follows:—

Patron—His Grace the Most Rev. Fergus Patrick McEvay, D.D., Archbishop of Toronto.

President—Matthew O'Connor, 106 Maitland St.

Vice-Presidents—Eugene O'Keefe, J. J. Murphy, Thomas Long, Remy Elmsley.

Secretary—W. T. Kernahan.

Assistant Secretary and Agent—P. Hynes, 181 Wilton Ave.

Treasurer—Daniel Miller, 71 Charles St. West.

Hon. Solicitor—Hugh T. Kelly, K.C.

Physicians—Drs. McKenna, McKeown, McMahon and Sweeney.

Committee—Messrs. J. J. Seitz, J. T. Ryan, L. V. McBrady, J. J. Hanratty, L. J. Cosgrave, T. J. Ford, T. B. Winterbery, J. B. Wright, F. P. Lee and John Rodgers. Mesdames Falconbridge, Elmsley, Hynes, French, Watson, Long, Kelly, Misses Walsh, Hart and Macdonnell.

Advising Board—Matthew O'Connor, the Very Rev. Dean J. L. Hand, Remy Elmsley, James J. Pape, Hugh T. Kelly, K.C., and P. Hynes, Secretary.

Auditor—W. T. Kernahan.

All of which is respectfully submitted.

M. O'Connor,
President.

OTTAWA.

The seventeenth annual meeting of the Children's Aid Society of Ottawa was held on October 14th, 1909, in the City Hall, at 4.30 o'clock in the afternoon, Mr. W. L. Scott, President, in the chair.

The report of the Secretary, Mr. John Keane, called attention to the favorable, if not unique, position occupied by the Ottawa Society as compared with other Children's Aid Societies of the Province. It stated:

We have here not only all the appliances of the Children's Protection Act of Ontario, but have in addition the activities of our Probation Officers, the Detention Home, the Juvenile Court, with its special Judge, and to crown all the operation of the Juvenile Delinquents Act in dealing with mischievous and delinquent children and young persons. This latter advance, as is well known, is due to the indefatigable labors of our worthy President, who, in spite of discouragement and lack of enthusiasm from some of those who might be supposed to have helped, kept pushing the enactment of the Juvenile Delinquents Act until it was an established fact. We are glad to be able to state that on the 24th of July last this Act was duly proclaimed by the Governor-in-Council, and is now in force in the City of Ottawa. We have thus the great advantage of a Juvenile Court, Juvenile Detention Home, Juvenile Court Committee, a Juvenile Court Judge, with three Probation Officers engaged for the purpose of carrying out the provisions of this Act. The result has been, so far, such as to amply justify the hopes entertained that when that statute was put in force it would have a salutary effect. This has been particularly marked in the falling off in the number of juveniles required to be sent to Industrial Schools. It is not, remember, that our Industrial Schools are less efficient and useful than formerly, for indeed without their valuable help we could not hope to do the work we are doing, but that recourse to them is rendered less necessary and frequent than in former years owing to the facilities which we have within ourselves to cope with the problems which are set before us.

The number of children dealt with and taken in charge by the Society was 67; number committed or transferred by parents, 30; number allowed to remain with or replaced with parents, 29; replacings, 25; placed out for the first time, 40; industrial schools, 4; Good Shepherds, 4; retaken, 1; sent to other homes, 3.

This year has been noted for several other matters of grave import. We have been instrumental in bringing to justice one woman convicted of ill-treating her child, and sentenced to seven years in the penitentiary; another man for offence against the family relation, four years; a woman charged with abducting one of our wards (the child being her own), was sentenced to one month in jail; one man was fined twenty-seven dollars for employing his child, contrary to the Children's Act, on the streets; and others have been fined in less amounts for various forms of delinquency, not a few being that concerning cigarettes and tobacco.

The year has not closed without some points of human interest and touches of romance, six having passed from the youthful stage into married life. In some of these we took a personal interest and assisted not a little to the happy termination.

The report of the Superintendent of the Detention Home goes to show that good work is being done among children who could not be adequately dealt with by the Probation Officers. Many of these children are, after a short stay at the Detention Home, allowed to return to their own homes and are placed under the supervision of the Probation Officers.

The President, Mr. W. L. Scott, in his address, dealt particularly with the Juvenile Court Law, and called attention to the fact that Ottawa is, as yet, the only place in Ontario where this Act is in force. The Act is in force in Manitoba, and is likely soon to be put in force in Quebec and Prince Edward Island, and is being agitated for in the three Western Provinces, but Ontario lags behind. The President suggested the appointment of a permanent paid officer for each county in Ontario who, in addition to performing the ordinary duties of an agent of the Children's Aid Society, would be charged with the enforcement of the compulsory Education Act. Truancy is much bound up with child neglect and delinquent children.

Mr. Scott congratulated the Society in being successful in having their capable Secretary's salary raised to $1,200, and in having an assistant appointed who will relieve him of the Associated Charities work. The President is of the opinion that the Secretary's salary is not yet adequate for the duties he has to perform.

The Treasurer's report for year ending September 30th, 1909, was as follows:

Receipts—Cash on hand from 1907-08, $262.40; subscriptions as per list, $1,187.36; City of Ottawa grant, $300.00; refunds, $9.14; bank interest, $7.71; total, $1,766.70.

Expenditure—Salaries, Probation Officers, office help, etc., $931.00; printing and stationery, $190.67; telephone of Probation Officers, $50.00; car fares and travelling expenses $189.33; sundry accounts, $58.20; balance in bank, $347.50.

Sir Louis H. Davies, on the conclusion of the reading of the reports, congratulated the Society on the very satisfactory statements that had been made. From the complete report of the Secretary covering all the field and the reports of the various other officers, he thought they were particularly fortunate in having a President and Secretary who were so singularly equipped for the discharge of their important duties.

The Juvenile Court Judge, Mr. J. E. Askwith, being called upon, spoke of his warm interest in the work and the excellent results. So far as he knew he had done his share, and was in thorough sympathy with those who were endeavoring to reform juvenile offenders by dealing with them in a fair and judicious spirit. He congratulated the Society on its excellent showing. He would so far as he was able second their efforts in every reasonable way.

The election of officers resulted as follows:

President—Mr. W. L. Scott.
Hon. Treasurer—Mr. P. B. Taylor.
Secretary—Mr. John Keane.
Vice-Presidents—Sir Louis H. Davies, K.C.M.G.; Rev. Canon Pollard, Rev. F. X. Brunet, Mr. John Gorman, Mrs. John Thorburn and Mrs. Lamothe.

Council—Messrs. Cecil Arden, W. P. Archibald, Dr. Mary Bryson, P. Clarke, A. A. Dion, W. W. Edgar, C. A. Eliot, Miss S. Horne, Col. Irwin, C.M.G.; Mesdames Boisvert, Lacas and Larmonth, Mr. J. F. Orde, Mde. Rheaume, Mrs. A. Robertson, Miss Rothwell, Rev. W. A. Read, Miss Mary McK. Scott, Miss Sadlier, Rev. J. H. Turnbull, Mr. A. H. Whitcher, Mr. J. R. Armstrong, Mr. G. B. Smart, Mr. Fitzroy and Miss Marshall.

President of the Hamilton Society.

HAMILTON.

The annual meeting of the Children's Aid Society of Hamilton was held on June 23rd, 1909, the attendance being the largest in years. The President, Mr. Adam Brown, occupied the chair.

The report of the Secretary, Miss Elsie B. Forbes, showed that during the year eight regular meetings and one special meeting were held, in addition to several committee meetings regarding the erection of a shelter. Complaints affecting between fifty and sixty children were investigated, the homes, in many cases, being visited monthly.

Fifteen children were taken over by the Society and placed in good foster-homes, while the home surroundings of the rest were vastly improved. Six boys and two girls were sent to Industrial Schools. Seventeen girls and nine boys were placed in foster-homes, and the Society still has several children distributed among the different institutions for whom they expect to get homes shortly. Most of these children are quite young. It is felt that a Children's Shelter is greatly needed in Hamilton, and efforts are being made to secure such a building. The Secretary's report drew particular attention to the value of the services of Mr. William Hunter, the Society's Inspector.

The financial report was presented by the Treasurer, Mr. J. M. Burns, and stated that the Society started the year with a balance of $1,647.46. The receipts brought this amount up to $2,109.05. The disbursements were $441.46, so that the Society has a balance on hand of $1,657.59.

In moving the adoption of the report Mr. Brown said:

The report which has just been read by Miss Forbes speaks for itself. The result of the past year of the devoted labors of the several Children's Aid Societies in Ontario is such as ought to gladden the hearts of all philanthropic people. Since the passage of the Gibson Act sixteen years ago 5,200 children have been removed from neglect, sin and cruelty and placed in good foster-homes, where they have grown up and will grow up to be good citizens, and in addition the home life of over 4,000 children has been improved by visits and warnings. As Mr. Kelso says in his exhaustive report, "All this calls for a great deal of thought and care in the working out, so that there may be no injustice, ill-treatment, or other abuse of the rights of children." There are 57 branch Societies in Ontario. Last year 425 children were rescued from degrading surroundings and placed in homes where they would be brought up and fitted for honored positions in life. Since the Society was organized we have found homes for 280 children such as I have been speaking about, many, if not most, of whom have been either burdens or menaces to society. I have been your President for fourteen years, have felt a pleasure in the work, and am gratified at the result.

The mission of the Children's Aid Society, to quote from Mr. Kelso, is:

1. The betterment of children in their own homes.

2. Their removal when necessary to insure a chance of becoming good citizens.

3. The endeavor to assist every child to receive fair treatment, wholesome surroundings and good moral influences.

4. The finding of good eligible foster-homes for all children made wards of the Society.

5. Careful supervision without undue interference after being placed in foster-homes.

6. To receive and inquire into complaints of neglect or ill-treatment of children.

It may not be generally known that the wards of the Society are visited at regular intervals by the visitors appointed by the Government. Mrs. Harvie has for twelve years visited the Protestant children in their foster-homes, talked with them and their foster-parents. Too much praise cannot be accorded to that devoted lady for the good she has been the means of doing; her visits have brought sunshine and cheer wherever she went—her work will live after her. She now does less outside work, but has a most important duty in having an eye over the visiting. Mr. O'Connor, a most efficient officer, visits the foster-homes of the Roman Catholics—his reports as well as those of Mrs. Harvie and others temporarily employed, are all very complete and full of encouragement. The placing of children has its difficulties and we have to be patient; changes have often to be made for various reasons, but the diligence and good judgment of our zealous Inspector, Mr. Hunter, always gets things right in the end. I cannot speak too highly of Mr. Hunter's work. His sympathy and good sense combined banishes many a difficulty. I could wish that all the churches would send delegates to our quarterly meetings and be able to report to their people what is being done. But few responded to my request to do so, only eight out of fifty congregations.

I feel it must be from want of thought rather than want of heart. However, I am going to send out another letter to the clergymen in charge and see what it will bring forth —there is nothing nobler they could lend a hand to than our child-saving work.

I do hope that when his Worship the Mayor is in possession of the information regarding shelters elsewhere, which he has asked for and which we are getting, that he and others in authority will provide a shelter and enable the Society to deal with incorrigibles as we can, instead of having them sent to the reformatories, as the Magistrate is obliged to do. It will pay any community twice over to rescue and protect its helpless and friendless children—assisting them to become self-supporting and self-respecting. While thanking the various homes in the city for care of our children until such time as foster-homes are provided, I wish especially to thank the ladies connected with the Infants' Home for so often going out of their way in assisting us in our work.

I feel that on an occasion such as the present I ought to say how much all our Societies are encouraged by the sympathy and support of the Honorable W. J. Hanna, Provincial Secretary. He has a thorough conviction of the value of our work to the country and he proves it by his encouragement. In Mr. Kelso we have not only an able head, but one who not only leads but inspires others to work. He is ever thinking out what is good for the child. He has recently taken active interest in playgrounds for children in cities. While our Society seeks to rescue and save the children from debasing surroundings, it welcomes every movement for the uplifting and bettering of children. The movement afoot for securing playgrounds has our hearty support. Play, says a friend of the playground movement, "is the child's natural expression; not only is the health of the child benefited by play, but its mind and character are affected." There can be no two opinions on the matter. I wish it every success, and hope that some of our wealthy citizens will go down deep in their pockets and help the cause, which is to make better men and women for our country—let none be scared thinking large places are needed—a few small playgrounds are better than one large one.

I cannot close my remarks without giving expression to what I know is the universal feeling—how rejoiced we all are to see the father of the statute so fraught with blessings—under which we act, occupying the honored and responsible position of the representative of His Majesty in the premier Province of the Dominion. He continues his deep interest in our work. I received a letter from His Honor last night, saying how sorry he was that he and Mrs. Gibson could not be with us to-day, an important engagement preventing both, but wishing our Society every success, and telling me to be patient about the shelter, and perhaps later on we may get one on a better scale than now. He sent a substantial cheque to assist us. I express the wish not only of our Society, but of the entire community that he may long be spared to serve his country, and in the future, as in the past, help on every movement for the good of the people. Our mission is for the good of humanity. He who is indifferent to the claims of humanity lives to no purpose. Let those who want to be happy just shed joy on others. Dr. Chalmers said we must either be a blessing or a blot in this world—no such thing as a blank. Let us all seek to so live and act as to be blessings to all around us.

Officers.

The election of officers resulted as follows:

President—Adam Brown.

Vice-Presidents—Lieut.-Col. Moore, W. H. Wardrope, K.C.; W. A. Robinson.

Recording Secretary—Miss Elsie Forbes.

Treasurer—J. M. Burns.

Inspector—Wm. Hunter.

Executive Committee—Col. J. M. Gibson, Lieutenant-Governor of Ontario; George Rutherford, J. J. Greene, Lieut.-Col. Moore, W. H. Wardrope, K.C.; W. A. Robinson,

Mesdames Gibson, Wm. Hendrie, Lucas, W. H. Bruce, D. B. Pratt, George F. Glassco, Kilgour, Barker, Levy, Abbott, Zimmerman, E. Duffield, Urquhart, Henderson, F. Malloch, and Miss Lawson.

Visiting Committee—Mesdames Urquhart, Evans, Malloch and Levy.

Dr. O'Reilly was re-elected Honorary Physician, W. M. McClemont Honorary Solicitor, and Mrs. D. B. Pratt and Mrs. Urquhart Visitors.

BRANTFORD.

The work at Brantford has received a temporary check through the unexpected death of Mr. Thomson, but the officers are planning to appoint another Agent and to take up the work with renewed vigor. A proposition has been made to raise a fund and establish a Thomson Shelter for children. This would be a valuable addition to the Society's equipment and would also be a fitting memorial to one who devoted so many years of his life to the children.

The officers of the Society are as follows:

Hon. President—Rev. Dr. Mackenzie.

President—Frank Foster.

Vice-Presidents—W. B. Wood and A. G. Parker.

Assistant Secretary—J. L. Axford.

Recording Secretary—Miss Brown.

Treasurer—C. Cook.

Hon. Solicitors—Messrs. Harley & Sweet and Messrs. Brewster, Muirhead & Heyd.

LONDON.

The annual meeting of the London Children's Aid Society was held on the afternoon of December 13th, 1909, and the reports presented indicated that the past year was one of the most successful in the history of the organization.

The report of the Secretary, Mr. Joseph Sanders, showed that 116 children passed through the Society's hands during the year. Of these, 36 were placed in foster-homes for the first time, 19 were replaced in foster-homes, 29 were returned to parents or guardians, 10 were sent to Provincial Superintendent and other societies and institutions; 5 were committed to Industrial Schools, 2 died, and 14 remained in the Shelter. Of the children placed in foster-homes for the first time, 17 were boys and 19 were girls. The Society now has in foster-homes 232 boys and 251 girls or a total of 483 children. Since its inception the Society has had the legal guardianship of 761 children. Of those who are now able to look after themselves a good many are married and in homes of their own. There were received from Mr. Kelso during the year 219 reports of visits made to children by Provincial Visitors, the majority of these reports being of a gratifying nature. The Secretary also made several visits where special attention was needed. The number of communications received was 705, and there were 637 letters written. There were 110 applications received, 68 for girls and 42 for boys. Eight monthly meetings and one special meeting were held during the year. Mr. Sanders and the new Probation Officer, Mr. Stevenson, were in almost constant attendance at the Police Court to look after cases of juvenile delinquents. There were 205 young people brought up on various charges, of which number 130 were discharged, 60 allowed to go on suspended sentence, 5 committed to industrial schools, 5 fined, and 5 bound over to keep the peace.

The report of the Treasurer showed the receipts for the year to have been $2,827.43 and the disbursements $2,738.51, leaving a balance on hand of $88.92.

On the evening of the 13th December, Dr. J. T. Gilmour, Warden of the Central Prison, Toronto, gave an address in the First Presbyterian Church, London, on work for children, in which he said that the best results were obtained by kindness and commended the system of placing children in foster-homes rather than in institutions. The address was a very interesting one, and should be of great benefit to the work of the Society.

The following are the officers for the coming year:

Lady Patronesses—Mrs. G. C. Gibbons, Mrs. C. S. Hyman, Mrs. Adam Beck, Mrs. Thomas Coffey and Mrs. J. H. A. Beattie.

President—Sheriff D. M. Cameron.

Vice-Presidents—Mrs. Yarker, Mrs. Leonard, Mr. W. H. Wortman, and Mr. J. A. Stevenson.

Treasurer—Mr. J. I. A. Hunt.

Secretary and Inspector—Joseph Sanders.

Hon. Solicitors—Messrs. McKillop and Murphy.

Auditor—Mr. T. H. Luscombe.

Board of Management—Mrs. W. C. Allen, Mrs. F. P. Betts, Miss Boyd, Mrs. Geo. T. Brown, Miss Bullen, Mrs. Thos. Baker, Mrs. T. H. Carlin, Mrs. J. H. Chapman, Mrs. F. P. Drake, Mrs. H. Dreaney, Mrs. T. C. Duncan, Mrs. Thos. Galpin, Mrs. H. E. Gates, Mrs. J. H. Ginge, Miss Helen Gibbons, Miss Graydon, Mrs. J. T. Green, Mrs. F. R. Hardie, Mrs. F. F. Harper, Mrs. J. I. A. Hunt, Mrs. J. W. Jones, Miss Dora Labatt, Mrs. Leonard, Mrs. Talbot Macbeth, Mrs. McGarvey, Miss S. Macklin, Mrs. G. McLean, Mrs. B. A. Mitchell, Mrs. Mulkern, Mrs. A. Purdy, Mrs. D. Regan, Mrs. Frank Reid, Mrs. Jos. Scandrett, Mrs. F. Screaton, Mrs. C. N. Spencer, Mrs. S. Stevely, Mrs. James Thorpe, Mrs. E. B. Smith, Mrs. John Weld, Mrs. Wismer, Mrs. Yarker, Mrs. W. A. Young, Mrs. Andrew Thomson, Geo. W. Armstrong, Dr. A. V. Becher, Sheriff Cameron, V. C. Cronyn, Dr. F. R. Eccles, T. B. Escott, H. E. Gates, J. I. A. Hunt, F. Love, P.M.; Rev. M. D. O'Neill, A. Talbot, J. A. Stevenson, W. H. Wortman.

WOODSTOCK AND OXFORD COUNTY.

The Children's Aid Society of Woodstock and the County of Oxford held its annual meeting on November 24th, with the largest attendance in its history. The chair was occupied by Rev. Dr. McMullen.

The Secretary and Agent, Rev. C. S. Pedley, in presenting his report, referred to the vast amount of useful work that had been accomplished by Mr. Daniel Larke, but pointed out that there had only been slight traces of any organized effort to cooperate with him. The Society has now been reorganized and the members are going to work seriously with a view to placing Woodstock in the front ranks of the Children's Aid Societies of the Province. Since his appointment, which covers a period of five months, Mr. Pedley has investigated the cases of forty children, sixteen in the city and twenty-four in the county. Four of these children were made wards of the Society by the Magistrate and are now in good foster-homes, and twenty-four children are under observation in their own homes. Mr. Pedley has visited the Police Court seven times, has paid twelve visits to the homes of children, and many other visits in connection with the work; has written about eighty letters, and received the same number, etc., etc. At the request of Mr. Kelso, Mr. D. E. McIntosh, Agent of the Simcoe Society, visited children in their foster-homes in Oxford County during the past summer, but Mr. Pedley will now take charge of this branch of the work also. Mr. Pedley and Rev. Mr. Cochrane addressed a meeting in Drumbo recently, with the result that a committee of ladies and gentlemen was appointed to act in conjunction with the Woodstock Society in looking afer the interests of the children of the district who are in need of care.

The report of the Treasurer, Mr. A. Hastings, showed that the total receipts of the year amounted to $278.92, and the total expenditures to $265.98, leaving a balance on hand of $12.94.

An interesting feature of the meeting was an address by Dr. Gilmour, Warden of the Central Prison, Toronto, on "The Value of Childhood," showing from his experience with convicted prisoners the importance to the Province of child-saving efforts.

The following is a list of the officers of the Society:—

President—John Butler.
First Vice-President—F. R. Ball.
Second Vice-President—Dr. McMullen.
Agent and Secretary—Rev. C. S. Pedley.
Treasurer—A. Hastings.
Executive Committee—Mrs. W. L. McKay, Mrs. Geo. Smith, Miss Egan, Miss Pyper, Mrs. Spracklin, Mrs. Dickert, Miss Stone, Miss Magwood, Mrs. Frank Hyde, Charles Taylor, Drumbo; D. C. Rowe, Hickson; Charles Budd, Folden's Corners; A. S. Wells, Princeton; Dr. Stevens, R. E. Butler, Mr. Kirk, Chief Thompson, W. S. Bean, and George Parker.
Special Committee—The clergymen of the city.
Auditors—H. Sproat and E. J. Coles.

NORWICH.

A well-attended public meeting in the interests of the Children's Aid Society was held in Norwich on the evening of November 25th, 1909, with Mr. J. C. Shaw in the chair.

Rev. C. S. Pedley, of Woodstock, the County Superintendent, gave an excellent address, in which he cited many instances where children had been taken from bad home surroundings and placed where they would grow up to be good men and women. He also referred to several cases where, by the influence and help of officers of the Society, parents had been induced to live better lives and to take better care of their children. He stated that an effort was being made to provide the necessary funds to enable the county officer to give his whole time to the work, and asked that the people of Norwich would contribute their share.

Dr. Harvey followed with a short but appreciated address.

The following officers were elected:

President—J. C. Shaw.
Vice-President—J. D. Hogarth.
Secretary—Miss Shaw.
Treasurer—H. Webster.
Agent—J. H. Entwistle.
Committee—Dr. J. H. Frain, Mrs. W. E. Bowyer, Mrs. W. R. Brown, W. Fairley, F. Lees, Mrs. H. VanValkenburg, J. A. Yeo, and ministers of local churches.

INGERSOLL.

The annual meeting of the Children's Aid Society of Ingersoll was held on February 8th, 1910, when the year's work was reviewed.

The report of the Treasurer showed a balance on hand of $50.65.

The following officers were elected:—

President—T. R. Mayberry, M.L.A.
Vice-President—H. E. Robinson.
Secretary—J. F. Morrey.
Treasurer—R. J. Robertson.
Solicitor—J. Garfield Gibson.

TILLSONBURG.

Rev. Frederick Oliver, President of the Tillsonburg branch of the Children's Aid Society, reports that although it was found difficult at first to arouse interest in the work, this has been overcome. The Committee meet often and are quite active in the interests of children.

CHATHAM.

The annual meeting of the Children's Aid Society of Chatham and Kent County was held at Chatham on January 17th, 1910, and was well attended. The chair was occupied by the President, Mr. D. S. Paterson, who gave a short address, outlining the work. Mr. Paterson drew particular attention to the need that exists for the appointment of an Agent who could devote all his time to the work of the Society.

Mr. William R. Baxter, the Executive Officer, presented his report, in which he stated that he had accepted office temporarily upon the resignation of Rev. Mr. Gunton, but that he had not sufficient leisure at his disposal to take up the work permanently. Since taking charge he has written upwards of seventy-five letters, has attended the Police Court several times, has investigated cases demanding attention in the county and elsewhere, has placed three girls, aged about fifteen years, in good foster-homes, where they are contented and are giving every satisfaction, has looked into a case where a husband had deserted his wife and children, and has taken action where boys were crowding around pool-rooms, etc. At Christmas time a great many requests were received for help and where possible assistance was given, but the Society was greatly handicapped in its charitable work through lack of funds. A donation of $44.06 was received from the Jenny Wren Club for this purpose and was expended to the best advantage.

The report of the Secretary, Dr. R. V. Bray, showed that twelve meetings were held during the year and that the interest in the work of the Society was being kept up.

Interesting addresses were also given by Rev. Dr. Dickie, Rev. I. S. Boyle, Rev. W. H. Graham and Mr. J. W. Plewes.

The following is the financial statement for the year: Total receipts, $318.93; disbursements, $236.81; balance in bank, $124.36; invested, $500. Total, $624.36.

The officers of the Society are:
President—D. S. Paterson.
Executive Officer—William R. Baxter.
Secretary—Dr. R. V. Bray.
Treasurer—Fred Stone.
Solicitors—Thos. Scullard and S. B. Arnold.

DRESDEN.

The Children's Aid branch at Dresden continues to do useful work. The officers are:
President—Rev. B. A. Kinder.
Secretary-Treasurer—Mrs. P. C. Blackburn.

WINDSOR.

The annual meeting of the Children's Aid Society of Windsor was held on November 29th, 1909, those present being very enthusiastic over the work.

For some years this Society had not been very active, but in March, 1909, Rev. W. A. Gunton was sent to address a meeting for the purpose of arousing interest. He succeeded admirably, and his visit paved the way for a large meeting which was held a little later. Mr. Kelso attended this second meeting and gave an address, in which he

HOMES WANTED.

Any respectable family in Ontario, desiring to adopt a small child, will be given every possible assistance if they will address a letter to J. J. Kelso, Parliament Buildings, Toronto

Now in Foster-Homes and doing well.

explained fully all that it was possible to do for the betterment of neglected little ones. As a result, the Society is now established on a better basis and is building up a good work for the children of the district.

At the meeting the Secretary, Miss Holton, presented her report, which was, in part, as follows:

In March three cases were taken charge of by the Society; in April six complaints were received, and warnings were sent to three families in which children were begging, these warnings having a good effect; in May two babies were taken over, one of them dying and the other being placed in a good home, a home was found for a young girl, and eight cases were disposed of; in June two cases were investigated; in July three cases were looked into, one being tried in the Police Court; and in August one case was investigated, a warning being all that was necessary.

The officers for the coming year are as follows:

President—Judge McHugh.
Vice-Presidents—Sheriff D'Avignon, Frank Hutton.
Treasurer—Dr. Wm. A. Macdonald.
Secretary—Miss Holton.
Investigating Officer—Sergt. Reid.

ESSEX.

The Essex Children's Aid Society is actively engaged in looking after the interests of the children of the district, but Rev. J. A. Ross, who for some time has acted as Secretary, has removed to Wyoming, Ontario, and Mr. Roseburgh has consented to fill the vacancy thus created. The President of the Society is Mr. J. S. Laird.

SARNIA.

The annual meeting of the Children's Aid Society of Sarnia was held on November 19th, great interest in the work carried on being shown by those present.

The report of the Secretary, Mr. John Wilkinson, was presented and showed the year to have been one of continued activity. Eleven monthly meetings were held and one special meeting. Seventeen new wards were added to the Society's roll, and altogether the Society now has 109 children under its guardianship. During the year fourteen children were placed in homes for the first time and twenty-six were transferred from one home to another. Seven children were restored to their parents under the Society's guardianship. Fifty-seven applications for children were received, twenty-six complaints were investigated, 346 visits made in the town and 218 out of town. The Secretary attended Court fourteen times, had 260 interviews about children, received 345 letters and wrote 553 letters, besides cards and circulars in the interests of the work. Twelve addresses in the interest of the Society were given. The attendance of fourteen children at school was secured, and in forty-two cases clothing was supplied to those in need of it. All the wards of the Society are now placed out in good homes. Besides those directly under the supervision of the Society, eighty other children have received some measure of care. The Secretary spoke of the efficient work done by Mrs. Gilbert Causly, whose home is used as a shelter for the Society's children. He also thanked the Magistrates, the police authorities, the press of the town and county, the Town and County Councils and other municipalities, the benevolent societies and individuals who had aided so greatly in the work of the Society. There is a proposition now under consideration by the Town Council to acquire property for a park and playground.

Mr. H. Ingram, the Treasurer, submitted a financial statement, showing the receipts for the year to have been $912.15, and the disbursements $826.16, leaving a balance of $85.99.

Interesting addresses were delivered by Rev. Canon Davis, Rev. J. R. Hall, and Rev. C. F. Logan, and a very enjoyable musical programme was also provided.

Reference was made to the efficiency of the Secretary and Agent, Mr. Wilkinson, and a motion was approved that his salary be increased.

The following officers were elected for the ensuing year:

President—Geo. A. Proctor.

First Vice-President—G. L. Phillips.

Second Vice-President—W. F. Lawrence.

Secretary and Agent—John Wilkinson.

Treasurer—H. Ingram.

Solicitor—R. V. LeSueur.

Physician—Dr. Wm. Logie.

Executive Committee—R. G. McArthur, A. McLean, David Stokes, George S. Samis, J. F. Elliott, F. C. Watson, Melvin Harris, Rev. J. R. Hall, John Ferguson, Rev. S. Rogers, C. Wellerman, Mrs. W. F. Lawrence, Mrs. D. Clark, Mrs. A. J. Johnston, Mrs. T. F. Towers, Mrs. W. J. Hanna, Mrs. H. Ingram, Mrs. Wm. Ellis, Mrs. Geo. S. Samis, Mrs. John Dyble, Mrs. C. Stratford, Mrs. George Brown.

Mr. Wilkinson is one of those who as District Agent has given valuable service. During the year he visited foster-homes in four large counties, doing the work thoroughly and efficiently, and winning many friends among both children and foster-parents.

GUELPH AND WELLINGTON COUNTY.

The large attendance at the annual meeting of the Humane and Children's Aid Society of Guelph and Wellington County, held on October 28th, 1909, was an indication that the work and aims of the Society have the support and sympathy of the public. The meeting was a very interesting one, excellent addresses being delivered by Mayor Hastings and Mr. J. P. Downey, M.P.P., and an enjoyable musical programme being also provided. Sheriff Allen, the President of the Society, was in the chair.

During the year Rev. P. C. L. Harris resigned his position as Inspector of the Society to take up humane work in Toronto, and Rev. Amos Tovell was appointed to succeed him. That Mr. Tovell is ably performing the duties assigned to him will be shown by the following report:—

"Your Inspector has dealt with cases involving one hundred and seventy children. Some families were visited but once, others called for several visits, and in a few cases further action must yet be taken. From this large number nineteen became wards of the Society. It may be repeated—for it has often been spoken of—that this Society endeavors to encourage and warn parents to care for their children, and to provide properly for them, and only as a last resort does the Society ask to be made the lawful guardian of the children. It has appeared absolutely necessary to take this step to save nineteen children.

It is well known that the Society endeavors to place the children in foster-homes as soon as this may be satisfactorily done. Twenty children have been placed in homes, four of whom were twice placed. It does not always mean that a child is unsatisfactory or the home undesirable when a ward returns to the Society. Other things often come to pass which make it necessary for a child to be returned. Sickness in the home, or in the case of the child or changed conditions which come to every home make it necessary to place the child elsewhere."

About eighty wards in homes in this city and County of Wellington, were visited, and a separate report for each child was sent to Mr. Kelso of Toronto. With very few ex-

ceptions the conditions in these homes were highly satisfactory, and the girls and boys are doing well. It is surely being proven that this is an excellent way of disposing of neglected children. It is best for the child and also profitable in almost every case to those who adopt the children.

Some thirty other cases, including almost every unfavorable family condition, such as quarrels, want, drunkenness, truancy, immorality, called for investigation. Sometimes it was expedient to have an officer in uniform accompany the Inspector. Both city police and county officers have willingly and courteously rendered valuable assistance.

Much care has been given to the prevention of cigarette smoking by boys. It may be well to repeat that anyone giving or selling cigarettes or cigarette papers to any person under sixteen years of age, is liable to a heavy fine or imprisonment. Nor is it lawful to sell or give to any person under sixteen years of age tobacco in any other form, for his own use. Any person under sixteen years of age using cigarettes or tobacco in any other form is also liable to punishment.

The report of the Treasurer, Mr. T. G. McMaster, showed the receipts for the year to have been $2,784.86, and the disbursements $2,502.44, leaving a balance in the bank of $282.44.

A suggestion was made at the meeting by Mr. William Tytler, Inspector of Public Schools, that a permanent truant officer be appointed.

The following officers were appointed:—

Hon. President—Lieut.-Col. Higinbotham.
President—Sheriff Allen.
First Vice-President—Mrs. Goldie.
Second Vice-President—Rev. Mr. Glassford.
Secretary—Miss Melvin.
Treasurer—Mr. T. G. McMaster.
Solicitor—Mr. W. E. Buckingham.
Physicians—Drs. F. Walsh and H. C. McLean.
Inspector—Rev. Amos Tovell.
Veterinary Surgeons—Drs. G. Harvey and W. Davidson.
Auditor—Mr. George Chapman.
Executive Committee—Mayor Hastings, Mr. J. C. Chadwick, Mrs. Foster, Mrs. J. C. Smith, Mrs. William Macdonald, Mrs. H. C. Scholfield, Mrs. McIntosh, Mrs. D. Allen, Mrs. J. Anderson, Mrs. Charles Reynolds, Misses Masters, Robertson, Forbes, M. Howitt, Guthrie, Ida Lyon, Ald. H. B. Callander, Dr. Brock, D. Young, W. H. Hamilton, Revs. C. H. Buckland, W. H. Crews, W. G. Wilson, R. G. Watt, R. H. Bell, Bates, Arnold, Goodfield, Mrs. G. Griffin, Mrs. Downey, Mrs. C. W. Dawson, Miss Thompson.

Mr. Tovell acts also as District Agent for the Province and children's visitor. His work has been highly satisfactory, and meets with the approval and endorsation of all interested.

WATERLOO COUNTY.

At the annual meeting of the Children's Aid Society of the County of Waterloo, which was held at Preston on October 22nd, 1909, very encouraging reports were presented, showing that excellent work had been done by the Society during the past year. The meeting was well attended and great interest was manifested. A resolution was passed in which the Society pledged itself to do all in its power to secure a juvenile court and a detention home for the handling of juvenile criminal cases.

An important feature of the meeting was an address by Mr. G. Bogue Smart, of the Department of the Interior, Ottawa, on "The New Method of Dealing With Delinquent Children." Mr. Smart referred especially to the new Juvenile Delinquents Act, and said that since the Act had been enforced in Ottawa not one boy had been sent to a reform school.

The efficient agent of the Society, Rev. C. R. Miller, in his report, stated that child-neglect was greatly on the decrease in the County and that all connected with the movement were working in harmony and helping one another in every way possible to do the greatest amount of good for the children. Mr. Miller also did much work of a Provincial character by visiting outside places, at the request of Mr. Kelso, addressing meetings, interviewing officials, visiting children, adjusting difficulties, etc. The total number of cases investigated was 114, of which 70 belonged to the County. Eighteen children were made wards of the Society and 50 were placed in foster-homes and situations. Altogether during the year Mr. Miller provided homes for 73 children in addition to replacing children who were returned. Two children were removed from foster-homes, one child died, and two children had surgical operations performed on them. Several boys and girls who had been acting badly were allowed to remain in their own homes on probation. Three boys and four girls were sent to Industrial Schools and one girl was sent to the Refuge for Girls.

The report of the Treasurer, Rev. W. A. Bradley, Berlin, showed that after all expenses had been paid there was a balance to the good of $8.58.

COUNTY OFFICERS.

President—Rev. W. C. Boese.
Secretary-Treasurer—Rev. W. A. Bradley.
Agent—C. R. Miller, Berlin.
Committee—Sheriff Motz, Berlin; Rev. Father Spetz, Waterloo; J. R. Cavers, Galt; G. W. Tebbs, Hespeler; W. B. Ziemann, Preston.

BERLIN OFFICERS.

President—Rev. W. C. Boese.
Vice-President—A. S. Hallman.
Secretary—George H. Clarke.
Recording Secretary—Miss M. Lockhart.
Treasurer—Mrs. G. H. Lackner.
Hon. Solicitors—W. M. Cram and E. W. Clement.
Committee—The Officers, Mrs. Jacob Kaufman, Mrs. H. L. Janzen, Mrs. T. Eagan, Mrs. M. Wunder, Miss Maude Zinger, Miss M. Snyder, Sheriff Motz, Rev. G. D. Damm, Rev. W. A. Bradley, Rev. Father Fischer, Rev. J. W. J. Andrew, Peter Shupe and H. J. Bowman.

GALT OFFICERS.

President—J. R. Cavers.
1st Vice-President—Rev. J. D. McLauchlin.
2nd Vice-President—Rev. Dr. Antliff.
Secretary—James E. Kerr.
Treasurer—Mrs. Thomas Carscadden.
Committee—Baptist Church, James Ogg, Mrs. Joseph Welland; Central Presbyterian, Mrs. W. A. Wallace, A. H. Goodall; Free Methodist, Miss Mary Edwards, Alfred Carter; Anglican, Mrs. DeGuerre, F. H. Chapple; Knox Presbyterian, Mrs. Thomas Bennett, James Struthers; First Presbyterian, Mrs. J. R. Scrimger, A. B. Scott; Methodist, Mr. James Haw, Arthur Rogers; Lutheran, Fred Eidel; Salvation Army, The Captain.

NEW HAMBURGH OFFICERS.

President—Mr. John Wing.
Vice-Presidents—Residing Ministers.
Secretary—Henry Berlett.
Treasurer—Daniel Cressman.
Committee—Mrs. Michael Kreh, Mrs. Ollie Haunn, Mrs. Fred. Koehler, Mrs. William Buck, Mrs. George Graff, and Mrs. R. T. Winn.

HESPELER.

President—Mr. Eli S. Beer.
Vice-Presidents—The local Clergymen.
Secretary—Mr. Geo. W. Tebbs.
Treasurer—Mrs. G. D. Forbes.
Committee—Mesdames W. Kribs, John Flynn, Porritt, G. A. Miller, A. Witmer, A. H. Hagmeier, Hannah, Fred. Huether, Geo. Greutzner, Gilners, Riddle; Messrs. E. Parkin, A. Wehner, S. Ballard.

PRESTON.

President—B. W. Ziemann.
Vice-Presidents—The local Clergymen.
Secretary—J. S. Scott.
Treasurer—D. C. McPherson.
Committee—Representatives from various Churches; Miss E. Hurlburn, Mrs. Joseph Janzen, Mr. Otto Homuth, Mr. C. Dolph, Mrs. James Gillis, Mrs. Girard, Mr. W. H. Wagner.

WELLESLEY OFFICERS.

President—Mr. Charles Ottman.
Vice-Presidents—Residing Ministers.
Secretary—Mrs. H. K. Forler.
Treasurer—Miss Elizabeth Berdaux.
Committee—Miss Ada Ratz, Miss Kate McDonald, Miss Ada Greenwood, Mrs. William Kelterbourne, Mrs. Philip Berdaux, and Mrs. Philip Cleghorn.

WATERLOO OFFICERS.

President—Dr. Hilliard.
Vice-President—Rev. Father Spetz.
Secretary—Addison Taylor.
Treasurer—Mrs. Wegenast.
Committee—Mrs. Cranson Snider, Mrs. Alvah Devitt, Mrs. Cyrus Schiedel, Mrs. Frank Good, Miss Ridell, Miss Ball, Mrs. Jacob Conrad, Mrs. Ernst, Mrs. Edwin Snider, Mrs. Muir.

ELMIRA.

Rev. W. A. Gunton and Rev. C. R. Miller visited Elmira on January 17th, 1910, for the purpose of organizing a local branch of the Children's Aid Society. A meeting was held and a Society formed, with the following officers:

President—George Klinck.
Vice-President—Rev. A. R. Schultz.
Secretary—Rev. Paul Graubner.
Treasurer—J. P. Luckhart.
Committee—Mrs. John Weichel, Mrs. William Merkle, Mrs. Henry Gibson, Mrs. D. Hollinger, Mrs. J. Winger, Mrs. I. Hilborn, Mrs. A. Schroder, Mrs. A. Werner, Miss Salome Ratz, Mr. W. H. Otto, Miss C. Ruth, Mr. William O'Neil, Mr. Israel Brubacher, and Mr. Oliver Snider.

STRATFORD AND PERTH COUNTY.

There have been many discouragements in connection with the Children's Aid movement in Stratford and Perth County. Early in the year the work was reorganized, with Rev. W. L. Thom as General Agent, but owing to financial difficulty, he sent in his resignation. This position was then taken up by Rev. Hugh Ferguson, then of Queensville, and he has been at work since the beginning of October. Several meetings have been held for the purpose of creating fresh interest and enthusiasm, and Rev. W. A. Gunton, representing the Provincial Office, spent some time in the district. The prospects now are that the work will be placed on a more permanent footing and will receive a heartier support from the people. After hearing an address on the importance of the work the Ministerial Association of Stratford passed the following resolutions:

This Association desires to express its high appreciation of the splendid work carried on by the Children's Aid and Humane Society. We believe that the services of the Rev. Hugh Ferguson and those associated with him are of untold value in saving innocent and unoffending children from vicious and bad surroundings. The result of work of this kind upon the citizenship of our Dominion can never be fully measured. It is a service, too, meriting the "well done" of Jesus, who said, "Inasmuch as ye have done it unto the least of these my brethren ye have done it unto me." Most heartily, therefore, do we commend the Society to the generous sympathetic support of our fellow citizens, who may well esteem it a privilege to have a share in so noble a work.

Annual Meeting.

On November 9th, 1909, the annual meeting of the Society was held, with Sheriff Magwood in the chair.

Mr. Ferguson, in presenting his report, stated that he had felt greatly encouraged since taking charge of the work by the assistance he had received from the citizens generally and from the officers of the Society, the police, and the press. He said that $280 had been collected in membership fees and subscriptions, a generous response having been made to his appeal for financial aid. His report showed that twenty-seven complaints had been made to the Society and seventeen children made wards. A number of the children so taken over were left with their parents, upon the latter promising to act better towards them. Forty-five letters were written and ten visits made to wards. Mr. Ferguson also attended on fifteen occasions at the Police Court in connection with juvenile cases.

The report of the Treasurer showed that the Society had a balance on hand of $141.88, the receipts for the year amounting to $522.21 and the disbursements to $380.33.

Short addresses were given by Sheriff Magwood, Stratford; Mr. Gill, St. Mary's, and Mrs. Hamilton, Listowel, and it was decided to form a County Executive, composed of the officers of the Society and the Chairman of each of the county branches, this executive to meet once a year, or oftener, if necessary.

The following officers were elected:
Hon. Presidents—Judge Barron and Mayor Dingman.
Hon. Vice-President—Police Magistrate O'Loane.
President—Sheriff Magwood.
Vice-Presidents—Ald. C. Carter and the city ministers.
Recording Secretary—Miss Amy R. McPherson.

Treasurer—Mr. Wm. Maynard.

Agent—Rev. Hugh Ferguson.

Advisory Committee—Sheriff Magwood and J. J. Coughlin, Barrister.

Finance Committee—Mr. Geo. McLagan, Miss McPherson, President Magwood, and Treasurer Wm. Maynard.

Humane Society Committee—Wm. Steele, Veterinary Surgeon; Mrs. Benson, Thos. Dunseith, Mrs. T. Ballantyne and Rev. O. C. Elliott.

County Executive—The Officers of the Society with the Chairman of each Children's Aid Committee in the County.

LISTOWEL.

The annual meeting of the Children's Aid Branch at Listowel was held on December 18th, 1909, with Mr. A. L. McIntyre in the chair.

The report of the Secretary, Mrs. T. L. Hamilton, was read, and showed that several meetings of the Society had been held during the year, and that interest in the work was increasing. Eight children from the town and district were made wards of the Society and these were all placed in good homes.

Mrs. J. J. Foster, Treasurer, read the financial report, showing that about $120 had been raised during the year.

Rev. Hugh Ferguson, of Stratford, who is the Agent for the County, has visited Listowel several times and has called on a number of the leading citizens for subscriptions, meeting with a ready response.

Arrangements were made to extend the work during next year by making the meetings of the Society of an educational nature.

Mr. McIntyre stated that he could not retain the President's chair, as he was leaving town.

Following is a list of the officers elected:

President—Rev. D. W. S. Urquhart, B.A.

Vice-Presidents—Mrs. Purcell, Mrs. Foerch, and Rev. W. F. Price.

Secretary—Mrs. T. L. Hamilton.

Treasurer—Mrs. J. J. Foster.

Committee—James Tremain, D. S. Weber, Andrew Foerch, F. W. Hay, Mrs. Price, Mrs. W. Donegan, and Mrs. (Dr.) Large.

EXETER.

On February 15th, 1910, at the request of Mr. Kelso, Rev. Hugh Ferguson, of Stratford, visited Exeter and formed a Branch Society there, to be known as The Children's Aid and Humane Society of Exeter. The people seemed to be greatly interested in the movement and good results are looked for in the future.

The following officers were elected:

Hon. President—Mr. William Bawden, Reeve.

President—Mr. William Weidenhammer.

First Vice-President—Mr. F. W. Gladen.

Second Vice-President—Miss H. Kinsman.

Secretary—Mrs. S. Fitton.

Treasurer—Mr. Harrison.

Executive—All the resident clergymen.

ST. CATHARINES.

The Children's Aid Society of St. Catharines has, during the past year, done a great deal for neglected little ones. The following extracts from the report of the Agent, Mr. R. E. Boyle, will give some idea of the work accomplished:

A family of six children was taken over by the Society, the older ones being available for foster-homes and the younger ones being placed in the Protestant

Orphans' Home, where the Society boards its wards in the absence of a regular shelter. In another case five children were taken from their parents, who were leading a dissolute life. It was necessary to send the eldest girl to the Mercer Reformatory, but the parents pleaded so hard to have the other children returned to them that this was allowed. The home has now improved greatly, and the father expressed his satisfaction to the Society that they had been the means of making himself and his wife reform and lead a better life. A young lad who had been neglected by his parents and had got into bad habits was sent to St. John's Industrial School, as was also another boy whose parents were greatly addicted to drink. The Society received from Buffalo, through the deportation officer, two small children, a boy and a girl. These little ones were returned to their mother, who was very grateful to the Society. A boy who had got on the downward path was, at the request of his grandparents, sent to the Victoria Industrial School. In a number of cases where children were neglected a call from the Agent was the means of bringing about improvement. The Society feels greatly the need of a Shelter.

On February 9th, 1910, Rev. W. A. Gunton visited St. Catharines, and accompanied a delegation from the Children's Aid Society to the City Council to ask that a Children's Shelter might be provided. The Council could not see their way to erecting a Shelter at the present time, but when it was suggested that they give the Society a grant of $500 and let them do as they saw fit, either build, buy or rent, they were quite agreeable, and said that they thought this could be managed all right.

The following are the officers of the Society:
President—Rev. N. I. Perry.
Vice-President—Dr. W. H. Merritt.
Secretary—Mrs. Youmans.
Treasurer—Mr. E. Poole.
Hon. Solicitor—Mr. J. H. Ingersoll, K.C.
Agent—Mr. R. E. Boyle.

NIAGARA FALLS.

The annual meeting of the Humane and Children's Aid Society of Niagara Falls was held on November 22nd, 1909, and was largely attended. President Black occupied the chair.

The report presented by Mr. Black, who is Inspector as well as President of the Society, showed that the Society had been very active in both branches of its work during the year. In connection with the children's work, the following is a brief summary of what was accomplished:

Investigating children's cases	27
Investigating neglected homes	19
Thieving children	17
Finding homes for children	4
Interviewing drunken parents	3
Assaulting boys (Court)	2
Child beating	2
Family disputes	3
Sent to Mr. Kelso	1
Sent to Victoria Industrial School	4
Sent to Alexandra School	2
Visiting children in the County	60

In visiting the wards of the Society who are placed in foster-homes in the County, Mr. Black found conditions satisfactory. He mentions especially the following cases as

being encouraging: That of a bright young woman, a ward of the Society, who had married a well-to-do farmer and was very comfortably settled in a home of her own. This girl's brother, who was also under the Society's care, now holds a good position on the railway and is earning $90 a month. A girl of twelve has been adopted by a prosperous farmer and his wife, who are much attached to her, and state that they intend to leave her a farm of one hundred acres, well stocked. Another instance is that of a bright, steady, young man, a former ward, who is employed in large manufacturing works and earning $12 a week.

Excellent addresses were delivered by Mr. S. M. Thomson, of Brantford; Rev. Dean Houston, Rev. David A. Moir, Rev. John Crawford, Messrs. A. Monro Grier, K.C.; J. H. Stuart, and William Edwards.

The following officers were appointed for the ensuing year:

President and Inspector—Mr. Chas. Black.

First Vice-President—Mr. John Logan.

Second Vice-President—Mr. James Morden.

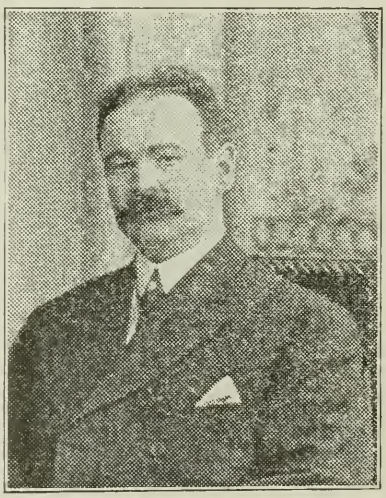
Secretary—Miss M. E. Smith.

Treasurer—Mr. J. G. Cadham.

Hon. Solicitor—Mr. D. B. White.

Hon. Veterinary Surgeon—Dr. Watson.

Executive Officers—Officers and Messrs. J. H. Stuart James Mowat, Dr. Robb, A. Monro Grier, K.C.; Dr. Wilson, John Muir, Dr. Musgrove, J E. P. Rothwell, Alexander Pierson, and Thomas Berriman, also the clergymen of the city; Mesdames J. H. Stuart, Norman, Walker, George Hanan, Frank Taylor, George Payne, Abel Land, F. J. Gribble, David Waltho, F. Anderson, H. R. Elliott, and James Barry, Misses M. A. Henderson, Annie Butters, and M. A. Black.



W. H. Wrightmyer,

Agent for Belleville and Hastings County.

BELLEVILLE.

That great interest is being taken in the work of the Children's Aid Society of Belleville and Hastings County was evidenced by the large attendance at the annual meeting, held on November 4th, 1909. Mr. C. B. Scantlebury occupied the chair.

Since the meeting of a year ago several changes have occurred among the officers of the Society, Mr. C. B. Scantlebury having resigned as President, Mr. A. E. Checker as Agent, and Mr. William McIntosh as Treasurer. Mr. Scantlebury thought that it

would be in the interests of the work that Mr. Thomas Ritchie be elected to the Presidency. This was done, Mr. Scantlebury agreeing to continue his connection with the Society by acting as Secretary. Mr. Checker left about the end of October to take up his residence in Australia and Mr. McIntosh found that he had to be out of town so much that he asked to be relieved of his duties.

Mr. W. H. Wrightmyer, who has been appointed to succeed Mr. Checker as Agent, is proving himself to be a most energetic and efficient worker, and has already looked into several cases and taken action.

The report of Mr. McIntosh, as Treasurer, showed that the total receipts for the year were $2,091.68 and that there was a balance on hand of $102.

Rev. W. A. Gunton was present, and gave a very interesting and instructive address on work for children. Mr. J. W. Johnson, M.P.P., also spoke, expressing himself as being fully in accord with the work of the Society.

Mrs. George Denmark was made a life member of the Society.

The following officers were elected:

Hon. President—Sir M. Bowell.

President—Mr. Thomas Ritchie.

First Vice-President—Mr. W. W. Knight.

Second Vice-President—Mr. S. A. Gardner.

Treasurer—Miss Benjamin.

Secretary—Mr. C. B. Scantlebury.

Recording Secretary—Mr. H. Wrightmyer.

Hon. Solicitor—W. C. Mikel, K.C.

Board of Management—Mr. W. W. Knight, T. Blackburn, S. C Clapp, Rev. Dr. Bishop, Rev. B. Greatrix, Rev. R. C. Blagrave, Rev. A. M. Hubly, Rev. Mr. Ford, Rev. G. R. Beamish, Rev. H. B. Kenney, Mr. J. Elliott, Rev. R. Wallace, A. E. Bailey, P. F. Canniff, J. Williams, W. B. Deacon, Mrs. J. Lake, Rev. A. H. Drumm, Miss Holden, Mrs. T. Ritchie, Mrs. H. Pringle, Mrs. C. Bird, Mrs. J. Lewis, Mrs. W. W. Knight, Mrs. Wm. McIntosh, Mrs. Anderson, Mrs. Benjamin, Miss Benjamin, Mr. H. C. Hunt, Mrs. H. C. Hunt, Mr. J. Colling, Mr. A. J. Marsh.

Opening of Shelter.

On July 5th, 1909, the Lieutenant-Governor of Ontario, Hon. J. M. Gibson, accompanied by his aide-de-camp, Captain Young, and by Mr. J. J. Kelso, Toronto, and Dr. Dickinson, Port Hope, visited Belleville for the purpose of opening the Society's new and commodious Children's Shelter. The occasion was a memorable one. The grounds of the Shelter were very prettily decorated with flags and bunting, and a number of booths in charge of lady attendants were scattered about, adding greatly to the appearance of the scene. There was a large crowd in attendance.

After an inspection of the building had been made, speeches were indulged in, Sir Mackenzie Bowell presiding over the gathering. Mr. C. B. Scantlebury, the then President of the Society, delivered an excellent address on the aims and objects of the Society, and the Mayor's address of welcome was read. The Lieutenant-Governor, in his reply, spoke eloquently on the benefits to be derived from work for unfortunate children, and expressed his approval of all that the Belleville Society was doing in this connection. He considered the new Shelter admirably adapted for the purpose for which it was intended and he urged the citizens to do practical work to assist in looking after the little ones. Mr. Kelso spoke of the pleasure it gave him to see the business men of the city taking an active interest in children's work, and expressed his appreciation of the work being done by the Society for the protection of the neglected children in this district.

In the evening a garden party was held on the grounds, which was very much enjoyed by a large number of people. Altogether, the affair was most gratifying to those in charge of the Shelter, and as a result of the function a goodly sum was realized.

BROCKVILLE.

The Children's Aid Society of Brockville held its annual meeting on December 9th, 1909, with a large attendance of representative citizens. The chair was occupied by the President, Mr. W. H. Osborne.

Mr. A. J. Traill, the Society's Agent, presented his report, which showed the progress made in all branches of the work during the year to have been very marked. Twenty-nine cases of complaint were investigated and dealt with. Nine children were made wards of the Society, eight of whom have been placed in good foster-homes, the ninth to be returned to her mother when conditions have improved. Six cases of truancy, comprising fourteen children, were reported and parents were warned that

Children's Shelter, Belleville

they must see that their children attended school. In four cases non-attendance was due to lack of proper clothing, and in these cases the Society supplied what was necessary and the children were sent to school. In eight cases where reports had been made of neglect on part of parents warnings were given and improvement has been made. Appeals have been made to the Society by parents who have to go out to work to have their children cared for during their absence and where possible such help has been given. The Society's Shelter, however, is too small to accommodate many in this way, and it is very desirable that a larger and better-equipped building should be secured. Grants have been received from the Town and County Councils, and financial assistance has been given the Society by private individuals interested in the work. Mr. Traill referred to the loss sustained by the Society in the death of Mr. A. Burges, of Fairknowe Home, one of its most sympathetic and valued workers.

Mr. C. E. Baynes Reed read his report as Treasurer, which stated that the Society started the year with a balance of $304.42, and the receipts were $1,125.65, all of which has been judiciously expended.

An interesting feature of the meeting was a very inspiring address by Rev. C. S. Pedley, of Woodstock. He complimented the Society on being a live and active one, but pleaded for more generous support. He also advocated the formation of ladies' advisory committees in every village and township in the Counties to keep the Brockville Society posted as to cases requiring attention, etc.

The Secretary, Miss Marron, read the report of the Ladies' Committee in the absence of Mrs. W. H. Comstock. It was as follows:

Mr. President and Members:

We beg leave to present a short report of our branch of the work. During the past year we have visited the Shelter at intervals and have always found the children well cared for and the matron most interested in her work. Anything in the way of clothing required we have supplied and have also attended to collecting contents in mite boxes, handing the same to the Treasurer.

At the last annual meeting the subject of some remuneration for the Agent was discussed. Our Committee undertook to raise $150 for this cause so that the regular fund need not be drawn on. We are glad to state that this amount has been raised and handed over to the Treasurer, and we still have a good balance for the new year.

ALICE J. COMSTOCK,

Convenor.

The following is a list of the officers of the Society:

President—W. H. Osborne.
Vice-President—Mrs. W. H. Comstock.
Secretary—Miss C. M. Marron.
Treasurer—C. E. Baynes Reed.
Agent and Officer—A. J. Traill.
Medical Attendant—Dr. Jackson.
Solicitor—H. A. Stewart, K.C.
Auditors—A. T. Wilgress, G. A. Wright.
Advisory Board—W. H. Osborne, H. A. Stewart, A. J. Traill, G. A. Wright, A. T. Wilgress.
Ladies' Committee—Mrs. A. C. Hardy, Mrs. W. H. Comstock, Miss Giles, Mrs. Connell, Mrs. M. Dowsley, Mrs. Findlay, Miss Smart, Miss McGannon.

KINGSTON.

On November 18th, 1909, the annual meeting of the Children's Aid Society of Kingston was held, with W. F. Nickle, M.P.P., occupying the chair. Rev. D. Macallum, Secretary and Agent, presented his report, showing that during the year fifty-five families were visited, some of them being called on more than once. There were also ten visits paid to the Court, where juveniles were up for trial. The Society now has forty-five wards, all of whom are in comfortable homes. The report pointed out the urgent need of a shelter and the necessity of raising more funds for the general work of the Society.

In closing his report, Mr. Macallum said that he wished to tender his resignation, as he no longer felt equal to discharging the duties of his office. He thanked all who had helped him in the work and expressed the hope that the Society would go on for all time and would improve every day.

Speeches were then made by G. M. Macdonnell, K.C.; Rev. Douglas Laing, W. F. Nickle, and Rev. Alexander Laird, all of whom spoke in glowing terms of Mr. Macallum's work.

An address was also given by Mr. Gunton from the Provincial Office.

Then followed the election of officers and on motion of G. M. Macdonnell, the officers of last year were re-elected, as follows:

President—Rev. Alexander Laird.

Vice-Presidents—Rev. D. Laing, Canon Cooke, and W. F. Fitzgerald.

Secretary—Rev. Mr. Macallum.

Treasurer—Prof. Dyde.

Solicitor—G. M. Macdonnell.

Committee—Canon Starr, Rev. William Craig, Rev. H. D. Whitmore, Miss Machar, Miss Muckleston, Miss Ronan, and Mrs. Macallum.

PEMBROKE.

The late Mr. S. M. Thomson visited Pembroke and addressed a meeting in the Town Hall on November 8th, 1909, with the result that a Children's Aid Society was formed and recognized by Order-in-Council dated November 18th, 1909. A number of prominent men are much interested in the Society, but as yet little work has been undertaken, owing to the fact that the local option campaign has claimed so much of the time and attention of the citizens. However, a movement is on foot to put the Society on a working basis at once, and no doubt Pembroke will soon take an important place among the Children's Aid Societies of the Province.

The following are the officers elected:

Hon. President—G. V. White, M.P.

President—J. S. Fraser.

Vice-Presidents—Edward Behan, Andrew Johnston and Dr. F. J. Dodd.

Treasurer—William Lacey.

Secretary—W. H. Bone.

Hon. Solicitors—Delahay & Reeves and White & Williams.

Executive Committee—The above and resident clergy, with four ladies yet to be named.

CARLETON PLACE.

By Order-in-Council, dated March 20th, 1909, a Children's Aid Society was formed at Carleton Place to take up work in the town and throughout the Township of Ramsay. The formation of the Society followed upon a visit by the late Mr. S. M. Thomson, of Brantford, who succeeded, during a short stay, in arousing great interest and enthusiasm in the cause of neglected and dependent children. He gave an illustrated address, which was well attended, and set going a Society which should be a great boon to unfortunate little ones for all time to come.

The editor of the *Central Canadian* gave the following description of Mr. Thomson's visit:

"Mr. S. M. Thomson, of Brantford, representing that branch of the Government's work which deals with the care of poor and neglected children, came to town on Thursday morning last from Perth, where on Wednesday he established and set going with eternal impulse a society under the terms of the Act. We suppose that no one, no evangelist, no minstrels with street parade and brass band with drum major, ever worked such a widespread interest as Mr. Thomson in so short a space. He got in touch with the Town Clerk and the Deputy Reeve, and they escorted him to the leading citizens, to whom he pleasantly explained his mission. Then he visited the schools, and

after a talk at each, suitable to the unfolding minds, he announced a picture show in the Town Hall in the evening, with a speech accompaniment, all free. Besides this he flooded the town with posters. Then he sat down in the Clerk's office to rest—his rest a regalement of the enrapt throng there assembled with incidents of his life of fifteen years in the rescue work. Mr. Thomson, orthodoxically speaking, is a man after Rev. Dr. Carman's own heart—one of the good old spiritually-nurtured types of Christian that come occasionally out of the past like fresh and fragrant breezes among the nervous, anæmic, germ-laden theorists of these latter days, withal sympathetic to the new notions, but clinging to the old traditions and offering clusters of fruit-bearing suggestions to all who would stretch forth a desire. A good man, therefore, and having a business training, he is, like one ordained, admirably adapted for his post."

The following officers were elected:

Hon. President—Mayor Cram.

President—D. Findlay.

First Vice-President—G. A. Burgess.

Second Vice-President—N. M. Riddell.

Secretary—W. C. Leech.

Assistant Secretary—J. R. McDiarmid.

Treasurer—A. R. G. Peden.

Hon. Solicitor—G. H. Findlay, K.C.

Agent—Alex. McAllister.

Committee—All the clergymen, William Findlay, William Baird, Robert Latimer, Robert Patterson and James E. Bennett.

ARNPRIOR.

At the request of Mr. Kelso, Mr. S. M. Thomson, of Brantford, visited Arnprior on November 11th, 1909, for the purpose of forming a Children's Aid Branch. At a largely attended meeting he explained the workings of the Children's Protection Act, and told of the great work done for unfortunate little ones since this Act was passed in Ontario, illustrating his lecture by showing many interesting pictures connected with child-saving. The evening was greatly enjoyed and appreciated by those present, and at its close a Society was formed to take up work for Arnprior and the County of Renfrew.

The following is a list of the officers elected:

Hon. President—Mr. H. F. McLachlin.

President—Mr. S. R. Rudd.

Vice-Presidents—Messrs. W. M. Howe, R. A. Jeffery, Edwin Farmer and John Brennan.

Secretary-Treasurer—R. M. Gemmel

Agent—Chief John Mattson.

Hon. Physicians—Dr. Jamieson and Dr. Armstrong.

Hon. Solicitors—Messrs. Dulmage & Dulmage.

Executive—The above and all resident clergy and not less than five ladies.

ALMONTE.

On November 12th, 1909, Mr. S. M. Thomson visited Almonte and addressed a meeting of the citizens, at which he fully explained the provisions of the Children's Protection Act and outlined the advantages of having a Society to look after the children whose parents and guardians failed to care for them properly. Great interest was shown and at the close of the meeting it was decided to form a Children's Aid

Society, to have jurisdiction in the town and also in the County of Lanark. Government recognition was later obtained and the Society is now in a position to take up the work.

The following officers were appointed:

Honorary President—Bennett Rosamond.

President—Dr. P. C. McGregor.

Vice-Presidents—William Thoburn, M.P.; W. H. Stafford, A. M. Greig, and Dr. Metcalfe.

Secretary—S. C. McLeod.

Treasurer—John Bain.

Agent—Chief Lowery.

Honorary Physicians—Dr. Kelly, Dr. Hanly, Dr. Lynch, and Dr. Metcalfe.

Honorary Solicitors—Messrs. Greig & Greig, W. H. Stafford and Harold Jamieson.

Executive—The above, all resident clergy, and not less than five ladies.

RENFREW.

In November 1909, Mr. S. M. Thomson, of Brantford, was invited to visit Renfrew for the purpose of assisting in the formation of a Children's Aid Society, and on the evening of the 5th a meeting was held, at which he delivered a very instructive address describing the workings of the Children's Protection Act, and pointing out the great advantage to children to be derived from the existence of a Society. As a result of this meeting, the Children's Aid Society of Renfrew was formed to take up work for the town and County, the following officers being appointed:

Hon. President—Mayor Gravelle.

President—Rev. W. H. Quartermain.

First Vice-President—W. H. Kearney.

Second Vice-President—Mr. Armstrong.

Third Vice-President—John Devine.

Secretary-Treasurer—E. J. Stewart.

GANANOQUE.

The annual meeting of the Humane and Children's Aid Society of Gananoque was held on November 16th, 1909, when an address was given by Rev. P. C. L. Harris, of Toronto. The meeting was largely attended by persons interested in Children's Aid and Humane work. A large number of the school children were present and prizes were awarded for the three best essays on Band of Mercy work. In connection with the Children's Aid work, a good deal has been done in the way of visiting families, clothing children, urging parents to send their little ones to school and Sunday School, etc.

The officers of the Society are:

President—Rev. J. T. Pitcher.

Vice-President—Miss Edith McCammon.

Secretary-Treasurer—Mrs. J. L. Rogers.

NAPANEE.

During the past year not many cases have come before the Children's Aid Society of Napanee, but when called upon the Society has always been ready to take action in the interests of the children. Visits were made to Napanee by Rev. W. A. Gunton, of Chatham, and the late Mr. S. M. Thomson, of Brantford, and meetings were held, at

which the addresses given were greatly enjoyed by those present. The Society is well officered, and it is hoped, and the indications are, that the present year will see it more firmly established in the hearts of all philanthropic people.

The following is a list of the officers:

President—Mr. F. Burrows.

First Vice-President—Mrs. McGurn.

Second Vice-President—Mrs. C. H. Edwards.

Agent—Chief Graham.

Assistant Agents—Mrs. C. Wartman and Mr. James Gordon.

Secretary—Mrs. Fred L. Hooper.

Treasurer—Mr. Dudley Hill.

Executive Committee—Rev. F. T. Dibb, Mrs. G. F. Ruttan, Mrs. R. G. H. Travers, Miss Shirley, Miss Checkley, Rev. J. R. Conn, Mrs. J. M. Fuller, Mr. James Gordon, Mr. A. Dunwoodie, Rev. George McCall, Mrs. A. W. Grange, Mrs. J. R. Dafoe, Mr. Thomas Jamieson, Mr. Henry Wilson, Rev. W. H. Emsley, Mrs. W. T. Gibbard, Mr. M. S. Madole, Mr. Fred L. Hooper, Mr. W. T. Gibbard, Rev. Father O'Connor, Mrs. McGurn, Mrs. Fitzpatrick, Mrs. Walsh, and Mr. P. Gleason.

PICTON.

The Children's Aid of Prince Edward County, established 1906, continues its work with increasing success. Meetings have been held regularly and a number of cases dealt with. Besides many cases in which improved conditions have been brought about without removal of children from the home, seven children have been made wards of the Society. Thanks largely to influence of the Children's Aid the Truancy Law has become effective in the town. A visit of the Rev. W. A. Gunton has had good results, leading to the appointment of an excellent Agent.

The officers are:

President—T. C. Tice.

Secretary—J. H. Dolan.

Treasurer—H. C. McMullen.

Agent—Rev. Wm. Shearer.

Assistant Agent—Miss Cunningham.

Solicitor—J. R. Brown.

CORNWALL.

The following report, prepared by the Secretary-Treasurer, Mr. J. C. Alguire, will show what is being done by the Children's Aid Society of Cornwall.

During the year 1909 the Society has found homes for four children and has received good reports both as to their conduct and contentment with their lot. A number of other children have been aided and advised and several parents have been warned that they were liable to lose their children if they did not give them better treatment, but it has not been found necessary to remove any other children from their homes. The Society is also wrestling with the truancy and cigarette evils.

The following are the officers of the Society:

Hon. President—J. A. MacDougald.

President—Alex. McCracken.

First Vice-President—Duncan Monroe.

Second Vice-President—Rev. Dr. Harkness.

Secretary-Treasurer—J. C. Alguire.

Agent—N. S. Johnston.

Hon. Physician—Dr. Alguire.

Hon. Solicitor—J. G. Harkness.

Committee—All local clergymen and ten ladies from the different churches.

TWEED.

The Children's Aid Society of Tweed is in good working order and has the support of the citizens, but during the past year not a great deal of work has presented itself. However, a few children came under the Society's care, and these have all been provided for satisfactorily.

The following is a list of officers:

Hon. President—Dr. P. T. Bowlby, Reeve.

President—Rev. James Binnie.

First Vice-President—George Clare.

Second Vice-President—Dr. A. J. Robertson.

Secretary-Treasurer—Mrs. George Frost.

Agent—P. K. Newton.

Committee of Management—Rev. Mr. Kirkpatrick and Rev. A. J. Terrill; Mesdames Wallace, Black, E. R. Huyck, Palmateer, J. E. Mitchell, James McGowan, and S. Way; Messrs. William Jones, Charles Clark, Dr. Farrell, S. B. Rollins, of Tweed; Rev. Mr. Dixon and Mrs. Shilabeer, Roslin; Mrs. Yeurex, Rev. H. Thomas and Mr. Wiggins, Queensboro; Rev. Mr. Connell and Mrs. S. Ketcheson, Thomasburg.

SMITH'S FALLS.

A Children's Aid Society was formed at Smith's Falls by Order-in-Council dated November 23rd, 1909, to take up work under the Children's Protection Act. As the Society has been in existence so short a time, not very much work has been accomplished, but it is hoped that through the assistance of the press the movement will soon become well known, to the great benefit of the neglected children of the town and district.

The officers of the Society are:

President—G. F. McKinnon.

First Vice-President—W. W. Williams.

Second Vice-President—J. F. Montgomery.

Secretary—W. T. Ferguson.

Treasurer—Robert Hawkins.

Agents—John Gile and W. W. Williams.

Physicians—Dr. Easton and Dr. McCallum.

Hon. Solicitors—John McEwen and Wilson McCue.

Directors—B. E. Sparham, Henry Miner, William Ewart, R. J. Brodie, R. C. Currie, John Stewart, Wesley Clark, W. F. MacDonald, J. B. Lyle.

LINDSAY.

The annual meeting of the Children's Aid Society of Lindsay and Victoria County was held on January 14th, 1910. The President, Dr. White, presented his resignation, but later withdrew it upon the earnest solicitation of the other officers of the Society, and agreed to act for another term.

Mrs. E. E. Sharpe, the Secretary of the Society, presented her report, which stated that six regular meetings of the Society had been held during the year and nine children had been made wards. A girl of thirteen, who was greatly neglected, was taken over by the Society and placed with some respectable relatives, who also had her brother living with them. These two children are now being brought up in the one home and are happy and contented. Two children were taken from the County House of Refuge. One of these was placed in a good foster-home, where she is doing well, and the other one was sent to the Sick Children's Hospital at Toronto in order that an

operation might be performed. The operation was most successful, and the child is now ready for placement in a foster-home. An extremely sad case was reported to the Society, where a mother had just died and had left a little baby and four other small children. The baby died, but the Society took charge of the other children and placed them all in good homes, the father voluntarily giving up possession, as he was unable to provide for them. A baby boy about two years of age was placed under the guardianship of the Society, both parents being dead. The Society received a grant of $100 from the County Council and $25 from the Town Council, and also received donations of clothing, etc., from the Women's Home Mission Society of Sonya and several private individuals.

It was decided by the Board to ask the County and Town Councils to increase their grants, in view of the fact that the Society was doing good work and needed more money to meet increased expenditures.

The report of the Secretary, Mrs. G. A. Milne, showed the receipts to have been $177.79, and the disbursements $171.23, leaving a balance on hand of $6.56.

The officers of the Society are:
Hon. President—S. J. Fox, M.P.P.
President—Dr. White.
First Vice-President—John Rogers.
Second Vice-President—G. Rea.
Third Vice-President—W. H. Stevens.
Fourth Vice-President—G. H. Wilson.
Fifth Vice-President—G. E. Broderick.
Secretary—Mrs. E. E. Sharpe.
Treasurer—Mrs. G. A. Milne.

PETERBOROUGH.

At the annual meeting of the Children's Aid Society of Peterborough, held on February 2nd, 1910, the following report was presented by the Secretary, Mr. E. L. Goodwill:

To the President and Members of The Children's Aid Society of Peterborough:

I have the honor to present the annual report as Secretary of your Society. Another year's work has been done, and a large number of children in the city and county have been cared for by the Society, and placed in foster-homes. Also a large number, by reason of notices and warnings to parents to improve home conditions, have been materially benefited. Perhaps more has been done in this latter direction during the last year than in any former year, and judging from the improvements already obtained we have reason to believe that the following of this policy will give excellent results.

Mr. Cochrane, the energetic Agent, has been kept busy investigating and reporting cases, serving notices and making visits to see that the warnings are being observed. Mr. Cochrane has devoted a large amount of time and attention to the work, and as he has a thorough knowledge of the methods of our Society and is sympathetic and tactful, he has performed his duties most efficiently.

Mr. and Mrs. Henry have continued to make improvements in the interior of the Shelter, and have also improved the grounds. The Shelter itself is maintained in the most satisfactory condition. Their work has been well and carefully performed. We have had a very large number of children in the Shelter continuously during the year, and all have been looked after by Mrs. Henry in a kind, motherly way, and there has never been a complaint during the year.

The outbreak of scarlet fever and chickenpox during the year in the Shelter, which necessitated a complete isolation for many weeks, made the work for our matron unusually heavy, and the extra work in nursing and extra expense incurred in supplying medicines and otherwise should be recognized by the Society.

It is with regret we have to record the sad event of the death of one of our wards, a little girl, aged seven years, who was the first patient in the Shelter with scarlet fever. This little girl was made a ward of the Society by order of the Court, and, notwithstanding the untiring attention, nursing and medical attendance, she passed away and was buried in the Society's lot in Little Lake Cemetery.

Forty-five children have passed through the Shelter, there being a monthly average of ten during the year, while a large number of children have been dealt with direct, and without being entered in the Shelter books. The large number of children continuously in the care of Mr. and Mrs. Henry have made a severe inroad on the funds of this Society, and this inadequacy of funds was the subject of considerable discussion and of extra effort to raise same by your officers.

The Society is fortunate in having such an enthusiastic and energetic Treasurer. Mr. Campbell has been untiring in the managment of the finances, involving, as it does, a large amount of his time, which he freely devotes to promoting the best interests of the Society.

We have to extend our warmest thanks to Dr. C. Hewitt Amys, who has devoted much time and professional skill to the children under our care. The physicians of the city all have been kind to us, but Dr. Amys has been particularly good.

The Society has acquired many new friends during the year, and to the new, as well as our old, benefactors we would again extend our thanks for many kindnesses received.

As Counsel for the Society, I have attended the trials of all juvenile offenders, and have seen that the provisions relating to the Children's Court have been carried out, and I would, as in former years, acknowledge the kindness and co-operation extended by the Police Magistrates of the city and county, and the members of the police force. There has been a marked decrease in the number of juvenile trials in the Police Court during the year, and there have been few cases of a serious character. We, however, regret that we found it necessary to send this year again a girl to the Industrial School, having exhausted all efforts for her reform.

A matter that calls for remark is the large percentage of children placed in the Shelter during the year from the County, involving an expense to this Society of over $600. A delegation, composed of Messrs. Campbell, Cochrane and Henry, waited on the County Council and urged that the annual grant from the County of $250 be increased in view of the above facts, but I understand the Council have not seen their way clear to accede to our request this year.

All of which is respectfully submitted.

(Sgd) E. L. Goodwill,

Secretary.

The following officers were elected:
Hon. President—Mayor W. G. Morrow.
President—Mr. T. F. Matthews.
First Vice-President—Mrs. Birdsall.
Second Vice-President—Mr. R. W. Travers.
Hon. Solicitor and Secretary—Mr. E. L. Goodwill.
Treasurer—Mr. Peter Campbell.
Agent—Mr. George Cochrane.
Hon. Physician—Dr. C. Hewitt Amys.
Board of Management—Officers of the Society and the clergymen of the city, Mesdames Best, Peck, Garvin, Davis, Warde, O'Sullivan, Montgomery, Potter, Hughes-Charles, Harding, Lloyd, Dr. Jessie Birnie, Miss Gow, Mrs. R. F. McWilliams, Miss Halliday, Miss Dickson, Mrs. Hazen Ritchie, Dr. George Burnham, D. Hughes-Charles, John Butcher, Magistrates Edmison and Dumble.

MADOC.

At Madoc there is a branch Society, which works in conjunction with the Children's Aid Society of Belleville in protecting the interests of the children of the district.

The officers are as follows:

President—Rev. H. S. Graham.

Secretary—B. J. McKerracher.

Committee—Mrs. A. Milne, Mrs. W. W. Hudgins, Mrs. M. Dingman and Mr. J. R. Brown.

PORT HOPE.

The following is a brief summary of the work done by the Children's Aid Society of Port Hope since its foundation in November, 1908:

The Society has had under its care ten neglected little ones, aged from three to thirteen years. For these good foster-homes have been found and regarding them many encouraging reports have been received. One lady in sending a photo wrote: "We like the child, he is good-tempered and of a good disposition; we would not part with him for a good deal." To see the smiling face, ruddy cheeks and general well-cared-for appearance of this little lad after he had been in a good home for a few months, and to have known him as a sad-looking, pale-faced, dirty, ragged, barefooted little fellow, the picture of misery, neglect and sadness just a short time previous, speaks more than volumes for the good works of the Society.

Another party wrote: "I often see your little boy, Willie. He is a very smart little fellow. This is a great contrast to what he was—a listless, ragged, woe-begotten urchin —when the Children's Aid first took him in charge."

One child belonging to the Society is in the Sick Children's Hospital under treatment.

As soon as these children came under the care of the Society they were placed to board in private families until suitable foster-homes could be found for them. During this time they were clothed and made as comfortable as possible.

There has never been any difficulty in finding good homes for foster-children. So great is the demand for children for adoption that there are always many applications that cannot be filled. For one little girl there were over a dozen applicants.

The report of the Treasurer showed the receipts to have been $79.65 and the disbursements $69.65, leaving a balance on hand of $10.00.

The following is a list of the officers of the Society:

President—Rev. W. G. Clarke.

First Vice-President—Mrs. E. J. W. Burton.

Second Vice-President—Rev. H. E. Abraham.

Secretary—George A. Dickinson.

Treasurer—Mr. R. Gray.

Hon. Solicitor—Mr. H. White.

Agent—Mr. A. J. Chesher.

Board of Management—Mrs. F. W. Wilson, Mrs. T. Ambrose, Mrs. R. Edmunds, Miss M. Renwick, Captain A. M. Murphy, Rev. F. J. O'Sullivan, Mr. J. F. Clark, Mr. J. H. Helm, Mr. H. Hume, Rev. W. H. Brokenshire, Rev. E. Daniel.

ST. THOMAS.

The annual meeting of the Children's Aid Society of St. Thomas was held on October 31st, 1909, with Sheriff McColl presiding and a large attendance present.

Secretary Shaw reported that during the year two children were committed to the care of the Society by F. Hunt, County Police Magistrate, a county child and a city

child who was apprehended in the county. Twenty-three children have been cared for in the Shelter, of whom nine were county children, ten were city children, and four were from the Provincial Shelter. On October 15th, 1908, there were in the Shelter: county children four, and city children three. Taken in during the year: county children four, city children nine, Provincial children three; total twenty-three. These children were: Placed in foster-homes for the first time, 3; replaced in foster-homes, 1; returned to parents, 9; committed to Victoria Industrial School, 2; sent to Roman Catholic Orphanage, London, 2; sent to Barnardo Home, Toronto, 1; sent to the County House of Industry, 1; Provincial children placed, 4; total, 23. There is only one child, a girl of fifteen, in the Shelter at present. One child has been returned three times, and is now in his fourth foster-home. Two others were returned twice. One child left his foster-parents and was found wandering about. After a few days' stay in the Shelter he was returned to his foster-home, where he was well pleased to be again.

At the request of Mr. Price, Mr. Shaw reported having visited Port Stanley four times, and at the request of Mr. Hunt, to have visited Vienna twice and Union twice, investigating such cases of juvenile offenders; also, at the request of J. J. Kelso, Superintendent of Neglected Children, he had visited forty-seven children who had been placed in foster-homes in Elgin County.

The day nursery, under the management of the committee of ladies headed by Mrs. J. H. Wilson, has proved its usefulness by the large number of children who have been cared for while their mothers had been at work.

The report of the Treasurer, Mr. H. S. Wegg, was presented and showed the receipts of the Society during the year to have been $1,222.26 and the expenditures $1,149.93, leaving a balance on hand of $72.33. The total assets of the Society at the present time are $3,497.50, and the liabilities $1,781.50, making the assets of the Society $1,716.00.

The report of the Day Nursery Committee was presented by Mrs. J. H. Wilson and stated that 709 children had been cared for in that department. These children are taken care of during the day, while their mothers go out to work.

The Board of Management reported that the prominent feature of the year's work had been the large increase in membership. A magnificent response was made by all classes to the call for financial assistance, and the ladies of the Society are undertaking to raise funds to pay off the mortgage on the Shelter.

The following are the officers of the Society:

President—Sheriff McColl.

First Vice-President—F. B. Holtby.

Second Vice-President—G. K. Crocker.

Third Vice-President—Dr. C. Marlatt.

Fourth Vice-President—A. M. Hutchison.

Treasurer—H. S. Wegg.

Secretary—W. J. Shaw.

Shelter Committee—Mrs. E. A. Smith, Mrs. J. H. Carrie, Mrs. G. K. Crocker, Mrs. E. Pavey, Mrs. W. E. Youmans, Mrs. D. McColl, Mrs. J. E. Shepherd, Mrs. A. L. Garland, Mrs. J. H. Coyne, Mrs. J. H. Wilson, Mrs. John Farley, Mrs. C. St. Clair Leitch, Mrs. J. M. Green, Mrs. Truman Duncombe, Mrs. S. O. Perry, Miss A. King, Miss M. Langan.

SIMCOE AND NORFOLK COUNTY.

The annual meeting of the Childrens' Aid Society of Simcoe and Norfolk County was held on February 8th, 1910, and was fairly well attended. Good-will and enthusiasm were characteristic of the gathering. The Society has a Shelter where the children can be cared for temporarily and the work is prospering very well, though it might be extended considerably if larger funds were available. Rev. W. A. Gunton, who

was recently deputed to visit Simcoe, reported that he found public feeling greatly in favor of the work. Mr. D. E. McIntosh, the efficient Agent of the Society, has been appointed High Constable of the County.

In his report, Mr. McIntosh stated that about 100 children had been visited in their foster-homes during the year, and that in almost every case conditions were satisfactory. Many cases of alleged neglect were reported to the Society and investigated. In some instances advice has been acted upon by the families visited and further action has been unnecessary, but in extreme cases the children have had to be removed. Sixteen children have been taken in charge. Of these, nine are placed in foster-homes, four are at the Shelter, two were allowed to return to their parents upon their promising to do better, and one is left with its grandmother. One case was brought before the Police Magistrate and the father was allowed to go on suspended sentence upon promising to send his children to school, which he has done. One of the children in the Shelter is suffering from a cataract on the eye and arrangements have been made to have her received at the Sick Children's Hospital, Toronto, where an operation will be performed. An effort is now being made to form branch Societies in the larger towns and villages of the County.

The following are the officers of the Society:

President—Frank Reid.

Vice-Presidents—H. S. McPherson and George Williamson.

Secretary—T. J. Agar.

Assistant Secretary—Miss V. E. Witham.

Treasurer—E. Boughner.

Executive Committee—J. B. Jackson, H. F. Cook, J. D. Christie, Miss Pauline McCool and Miss Steinhoff, with officers and local clergymen.

COURTLAND.

Mr. Gunton visited Courtland, Norfolk County, on December 29th, 1909, and held a meeting in the Methodist Church, with the result that a branch Children's Aid Society was formed, to take up work for children in conjunction with the Society at Simcoe. Considerable interest was manifested in the movement and the following were appointed officers:

President—Aloy Wilkinson.

Vice-President—W. M. MacKay.

Secretary—W. A. Byersley.

Treasurer—E. A. Buchner.

Committee—James H. Dean, Albert Cowan, A. O. Buchner, J. W. Cameron, G. T. Youse, Henry Wallace, Elwin Stillwell, B. A. Mitchell, Ozias Pettitt.

CALEDONIA.

In February, 1910, Rev. W. A. Gunton visited Caledonia and formed a Children's Aid branch there, with the following officers:

President—Alfred Atkinson.

Secretary—Rev. Mr. Godden.

Treasurer—John Avery.

Committee—G. H. Hornibrook, Hugh McLellan, Dr. Maw, Rev. A. E. Smith, Rev. Mr. McQuarrie, Rev. Father Cleary and Mr. Harry.

OSHAWA.

The report of the Secretary of the Oshawa Society, Miss M. H. Nash, will show what has been done during the year. It is as follows:

The Children's Aid Society of Oshawa continues to do good work and is indebted to outside workers, for having given valuable assistance at our quarterly meetings during the past year, arousing interest and enthusiasm with addresses given on the "Neglected Child," and making the well-attended meetings bright with music and recitations. Our Agents have at each meeting given excellent reports of work done during the year 1909.

Two boys have been committed to the Industrial School by the Magistrate as needing more discipline. One boy, aged six, was sent to Sunnyside Orphanage. Three children were adopted in good homes. Many were cared for during typhoid fever. Parents addicted to drink and cruelty were warned of neglecting and ill-treating their children, and now under the close watch of our Agents the families and surroundings have become more comfortable and the spirit of cleanliness is growing prevalent in these once neglected homes.

One of the main objects of the Society has been to prevent parents from sending their children begging, and we are pleased to record a case is very rarely heard of now.

Other cases of boys stealing, etc., have been dealt with by the Society during the year. Applications for children have also been received. Mr. E. E. Sharpe, of Lindsay, was deputed by Mr. Kelso to visit homes of children placed in this district, and found them happy and comfortable. Our expenses have been met by donations, collection of boxes placed in homes and stores, and also the proceeds of a concert kindly given by the organist and members of the Presbyterian Church.

The officers are as follows:

President—F. L. Fowke, M.P.
Vice-President—J. D. Storie.
Treasurer—Mrs. J. W. Borsbery.
Secretary—Miss Helen Nash
Hon. Solicitor—C. A. Jones.
Agents—Alfred Schofield and Alfred Hinds.

OWEN SOUND.

Following is the fifteenth annual report of the Children's Aid Society of Owen Sound and the County of Grey, prepared by the Agent, Mrs. J. E. Lediard:

The Children's Aid Society of Owen Sound and the County of Grey has been accorded another year of service in the work of caring for some of the neglected and dependent children in our midst, and this work has been wider and more far-reaching than any year in our local Society's history. It has been our duty and privilege to have rescued, through the Courts, no less than eighteen children; while a little temporary assistance has been rendered to eleven others, either as guests in the Shelter for a short time, or in their own homes, or as boarders in the Shelter, at the expense (in whole or in part) of their friends.

The following is a brief history of the children committed by the Courts:

No. 1—Was a baby girl of about four weeks old, the illegitimate child of a fifteen-year-old girl, whose parents were too poor to provide for her. She was committed to this Society by the Bruce Magistrate, and at that County's expense, until a good home was found for her, and as she was an unusually attractive child, and a *girl*, this was soon done.

No. 2—A bright little boy of nearly three years (and his brother a year older) had been deserted by their father and were the children of a woman of bad character,

Some Specimen Wards of our Societies.

and as they were being very much neglected, they were committed to the Society. After remaining in the Shelter for a short time he was adopted into the otherwise childless home of a farmer and his wife, in a distant part of the County.

No. 3—His brother remained in the Shelter for some time longer, until the said farmer and his wife brought their adopted son on a visit and to show what a handsome little fellow he had become. The mother was so touched by the meeting of the little brothers as they kissed and clung to each other that nothing would satisfy her but she must have both. Her husband expressed the opinion that it was a poor farm which could not raise two boys, and they were both carried off, as bonny a pair of youngsters as heart could desire.

No. 4—A boy of about eight years old was committed by the Magistrate of Dufferin County, on a charge of being neglected, and never was a charge more justly laid. He is the son of a very aged father whose wife had died, leaving him with a family of quite young children; the boy was rescued from a condition of squalor, dirt and neglect not easily imagined, much less described. His health is improving all the time and he bids fair to become a nice boy.

No. 5—Was left at the Shelter on a promise from his father that his board should be paid as soon as he was able to earn the means. After waiting for the fulfilment of this promise, until patience had ceased to be a virtue, the boy was taken before the Magistrate, and committed to the Society. He is a dear little fellow, and would be a treasure in a good home.

No. 6—Complaints were laid that a little girl of about three years was being brought up in circumstances not good for her, and she became a ward of the Society, but instead of the mother bringing her to the Shelter, after being by her urgent request granted a few days' grace, she departed, taking the child with her, and so far has not been located, but we are biding our time.

Nos. 7 and 8—Are boys aged respectively eleven and eight, and were taken before the Magistrate on a charge of being neglected and ill-behaved; and as their mother was dead and their father failed to care for them, they were committed to the Society's care, and both are in good homes.

No. 9—This was a girl of about eleven, whose mother was dead, and the condition of the home such as to call for repeated complaints and appeals for rescue, as it was feared she was rapidly degenerating, and would soon be too far gone for help. She was made a ward of the Society by the Court and also committed for an indeterminate sentence to the Alexandra Industrial School. Reports from that institution are so favorable as to encourage the hope, that in spite of early environment she may yet do well.

No. 10—A sister of the above of about eight years of age, has been adopted into a good home, and will, we hope, grow into a useful and respectable member of society.

No. 11—Is a boy of six, belonging to the same family and is still in the Shelter. He is a bright little fellow, and would grow up in a good home unhindered by early conditions.

No. 12—This girl of fourteen was not only made a ward of the Society, but was committed to the Alexandra Industrial School on a charge of incorrigibility. It is to be hoped that she may yet overcome her serious faults, and become the useful woman which she has the ability to be, as she is an unusually bright and gifted girl.

No. 13—A baby boy of about five months, was the illegitimate child of a mother who was unable to provide for him. He is now nearly a year old, and needs a good home, where he would be a treasure.

No. 14—A girl of about thirteen was committed to the Society because her mother is an epileptic, and her father is paralyzed, but as a home was awaiting her, she was at once sent to it, without being placed in the Shelter at all.

No. 15—Is an illegitimate baby girl of over three months' old, and weighs between five and six pounds. She was born on the lakes, and subsequently deserted by her

mother. Her hold on life has been so feeble that it is scarcely possible that she can live to grow up, and it would perhaps be to her own interest not to do so.

No. 16—Is a baby boy born of an insane mother now in the Asylum. This poor little one was rescued from such a condition of neglect that it became an imperative duty to take it into the Shelter and make it as comfortable as possible. That the father promised to pay for its maintenance, and failed to do so, made no difference to the child's need, and as he has four other children for whom he should provide, this poor little one comes under the meaning of the Act. What the future of such a child will be God alone knows, but in the meanwhile what constant care can do will be done.

No. 17—Is a girl of about fifteen and was charged before the Magistrate with writing obscene letters. She was made a ward of the Society, but allowed to go home with her mother while she behaves herself.

No. 18—This is a bright little girl of about three years of age who is illegitimate, and was committed to the Children's Aid Society because the father and mother both wanted to have possession, and were unfitted by circumstances and character to care for her. She will supply a want in some childless home, and will never know from what a pit of infamy she was rescued.

One of the discouraging features of the year's work was having to send two of our wards, aged eighteen and fifteen, who were in homes, to Toronto. They had been guilty of grave misconduct, the lamentable results of which made it necessary that they be placed in institutions where such cases can be cared for. No favorable reports have been received of either of these girls since.

Two other girls of fourteen and fifteen were reported as having visited a disorderly house in the town. As both girls had mothers, who promised greater watchfulness for the future, it is to be hoped that no further complaints will be forthcoming, but if so, they will have to appear before the Magistrate.

The work of placing, removing and replacing children has called for 53 changes. Not only is it difficult to find homes readily when needed but it is still more difficult for some children to keep these homes, and not always through any fault of their own. Three of our older girls, who had been in homes for a number of years, were returned for various reasons, but are now all placed in good positions where they have every chance to do well.

There are at present ten children in the Shelter, for nearly all of whom good homes are required, but as they are boys the work of placing them is slow.

It is not considered advisable to retain children in the Shelter for a protracted period of time, but where natural defects or bad habits make them undesirable subjects for adoption there seems to be no choice in the matter—we can only keep them and do our best.

There have been forty-two children in the Shelter during the year for periods of time varying from a day or two to the whole year, and wards of the Society who need to stay there while en route from one place to another, are heartily welcome, and it is the only home some of them have ever known.

A heavy trial befell the Society early in the year in the death of Mrs. Campbell. After about eight years of faithful service as Matron, in which position she had proved her efficiency in every way, her health began to fail, and while we were hoping that the coming spring would bring restored strength, a more serious attack proved fatal and she died March 16th, 1909.

As there was an extra large number of children in the Shelter at the time of Mrs. Campbell's death, cared for by one of the girls only, who had been under Mrs. Campbell's supervision for a number of years, it was necessary that prompt measures should be taken to procure another Matron as soon as possible. Out of six written applications, accompanied by references, and after careful consideration, the unanimous choice of the Executive was Mrs. Carson, of Wiarton. The subsequent history of the Shelter has more than justified their decision, for the children have a mother in the

fullest sense of the word, while in Miss Carson, her daughter, she has a most kindly and efficient helper.

By request, at the beginning of the year, I visited a girl in the jail who had been committed by the Magistrate to the Mercer Reformatory for six months on a charge of theft. As she was 16 years of age, she was too old to become a ward of the Society, but as she seemed a bright, intelligent, well-behaved girl, who might be helped, proceedings were set on foot which eventually brought instructions from the Secretary of State that on your Agent becoming responsible the girl was to be liberated.

A public meeting was held in the Town Hall on December 4th in the interests of the Society's work, with the Mayor in the chair. The speakers for the evening were Rev. Amos Tovell, Agent of Children's Aid Society, Guelph, and Mr. M. K. Richardson, Children's Visitor for Mr. Kelso. Their addresses were listened to with the close, interested attention they deserved. A recitation by Miss Jessie McGregor, of Kemble, and a solo by Miss Irving, accompanied by Mrs. Cummings, added much to the pleasure of the evening.

Much of the success of this year's work has been due to the efficient willing service rendered by the Society's Special Officer, Mr. King. On two or three occasions when complaints have reached me needing investigation at a distance, he has made the journey and the necessary enquiries. One of these trips was to visit a family near Wiarton which was reported as being a terror to the community. He also went to Tara to look up a missing child and took two of our wards to the city when committed to the Industrial School.

Early in December circular letters were prepared and mailed to all the teachers and pupils in the Public Schools in the County of Grey, soliciting interest and contributions in behalf of our neglected and dependent children. The response was exceedingly encouraging.

The officers for the ensuing year are as follows:

Hon. President—R. B. Miller, Esq.

President—H. H. Burgess.

Vice-Presidents—Dr. Allan Cameron, M. Forhan, James Shaw, Mrs. D. R. Dobie, Mrs. Bridgewater, Owen Sound; H. H. Miller, Hanover; E. Y. Godfrey and Mr. Huff, Meaford; N. W. Campbell, Durham.

Treasurer—C. H. Moore, Sheriff for County of Grey.

Secretary—A. E. Trout, Esq.

Hon. Solicitor—John Armstrong, Esq.

Agent—Mrs. James Lediard.

Executive—Mrs. H. H. Miller, Hanover; Miss Julyan, Brookholm; Mrs. McArthur, Durham; J. C. Ryan, Rev. Father Burke, Mr. Weisher, Rev. W. J. Cadman, Mrs. Burgess, Miss M. Fox, Miss Dobie, Miss E. Spragge, Mrs. Robert Shaw, Mrs. A. E. Trout.

Corresponding Members—Mrs. Gardiner, Kemble; Dr. Hamill and Mrs. E. Y. Godfrey, Meaford; D. Knechtel, Hanover; Miss Stevenson, Thornbury; Miss Breese, Chatsworth; Mrs. Pickle, Markdale; Rev. Mr. Wellwood and Mr. J. B. Egan, Dundalk; D. C. Day, Shallow Lake.

SUDBURY.

The annual meeting of the Children's Aid Society of Sudbury was held on February 17th, 1910. Rev. W. A. Gunton was present and addressed the meeting, urging particularly the importance of having a Children's Shelter at Sudbury. The Society is doing good work and all the members are greatly interested in looking after the interests of the neglected children of the district.

The following officers were elected:

President—George Elliott.

Secretary—Mrs. Frawley.

Treasurer—Dr. Patterson.

Inspector—Rev. Father Lefebvre.

Hon. Solicitor—James A. Mulligan.

Executive Officers—Mrs. G. Elliott, Mrs. W. S. Crawford, Mrs. J. H. Rowat, Mrs. Charles McCrea, Mrs. Struthers, Mrs. Clary, Mrs. Keeney, Mrs. Brodie, Mrs. S. N. Doyle, Mrs. McCormack, and Messrs. Clary, Eugene Grenon, W. A. Evans, James Templeton, W. Greenwood and Principal McCarten.

NORTH BAY.

The fourth annual meeting of the Children's Aid Society of North Bay was held in the Town Hall on January 27th, 1910, and was well attended. Rev. Father O'Brien, First Vice-President, occupied the chair, and the Secretary read a letter from the President, Mr. W. McKenzie, explaining his unavoidable absence, and pointing out briefly the condition of the Society and what it had done during the past year.

About twenty cases were dealt with during the year, and the most of these were made wards of the Children's Aid Society and have since been placed in homes under good and healthy influences. It was pointed out that, on account of the extent of the district and the long distances which frequently had to be travelled to investigate a reported case the expense connected with the work was large. It is hoped that an Agent will soon be appointed at a regular salary to do this work.

The officers for the ensuing year are:

President—W. McKenzie.

First Vice-President—Rev. Father O'Brien.

Second Vice-President—A. G. Browning.

Treasurer—E. W. Ross.

Secretary and Agent—James Stark.

CHARLTON.

At Charlton a Committee has been formed to take up work in connection with the North Bay Society, and since its formation three children who were neglected by their parents have been made wards, but have been allowed to remain with the parents on their promising to do better. The members of the Committee are men who are greatly interested in the welfare of children and will look after their interests carefully. They are: Mr. F. W. Roice (President), Mr. H. S. Malcolm and Mr. R. J. Stalwood.

EAST PARRY SOUND

As a result of considerable correspondence, and upon the application of those interested, an Order-in-Council was passed on the 5th of October, 1909, authorizing the Children's Aid Society of East Parry Sound to take up children's work in that district, with headquarters at Burk's Falls. The organization of the Society was the result of a number of cases of neglect and cruelty which had occurred in the vicinity, and the people of the district are enthusiastic in their desire to protect the rights of unfortunate little ones.

The following is a list of the officers:

President—Walter Sharpe.

Vice-Presidents—Mrs. Jean Burchill and the resident clergy.

Treasurer—Miss Gertrude Sylvester.

Secretary—Miss Annie L. Prior.

Council—J. N. Dodds, Mrs. George H. Sylvester, Miss West, C. W. Sharpe, Joseph Hilliar, Miss Minnie Allman, J. P. Waters, Mrs. Vincent Russell, Mrs. Jean Burchill, Walter Sharpe.

Agent—J. N. Dodds.

Solicitor—D. R. McLean.

KEARNEY.

A committee, consisting of Mayor A. J. O'Neil, R. McConkey, Police Magistrate, and Dr. W. E. Mason, has been elected at Kearney, to take up work in connection with the Society at Burk's Falls, known as the Children's Aid Society of East Parry Sound.

WEST PARRY SOUND.

By Order-in-Council, dated October 5th, 1909, a Society was formed, under the name of the Children's Aid Society of West Parry Sound, to take up work in the Town of Parry Sound and the surrounding district. There is a large country to be covered here, and a great work is possible in the interests of unfortunate children. In August, 1909, at the request of Mr. Kelso, Rev. C. W. Miller, of Berlin, and J. D. Knox, of Orillia, visited Parry Sound and addressed a public meeting. The formation of the Society followed.

The officers are:

President—Rev. J. W. Mahaffy.

Vice-Presidents—Sheriff Armstrong, Rev. C. E. Scott, Rev. Father Artus, Rev. C. W. Watch, Rev. Mr. Chillcot and the Salvation Army Officer.

Secretary and Treasurer—Joseph Ryder.

The Police Magistrate, Mr. J. Farrer, is also interested in the Society, and will render any assistance in his power.

ORILLIA.

The annual meeting of the Children's Aid Society of Orillia was held on December 3rd, 1909, with Mr. George McKee, the President, in the chair, and was fairly well attended.

The Secretary, Mr. J. D. Knox, presented his report of the work done during the year, of which the following is a brief summary:

In the latter part of 1908, a little girl, fourteen months old, was sent to the Sick Children's Hospital at Toronto to be treated for tuberculosis. Her mother was dead, her father had deserted her, and there was no one to care for her. After months of suffering the disease claimed its victim, but the poor child had had during the last days of her life every care and attention that loving and skilful hands could give. Another child from Orillia now occupies a cot in the same institution. At times it is found necessary to transfer a ward from one foster-home to another. As an example, we may refer to a girl nine years of age who has been in four different places. This has not, we believe, been necessary on account altogether of her own bad disposition, but rather because her guardians failed to show the patience and love which they agreed to do. It is a pleasure to be able to state that she has at last found a refuge where, under judicious treatment and firmness, she is likely to grow up into a happy and useful life and may yet prove a blessing to her adopted parents. The case of an Italian boy, an orphan, is full of interest. He was arrested for thieving, but was given to the Society, and sent to live on a farm. At first the farmer and his wife were horrified by the accounts he gave of his adventures, and they lived in dread lest their buildings should be burned down through the boy's habit of using matches. But he began to take an interest in farm life, a change came over him, and now his guardian cannot say anything too good of him. Some months ago, a town girl fourteen years old, growing into a regular street Arab, was taken by the Society and sent to a refined family at a distance from Orillia. From letters and other sources we learn that she is doing well and will yet thank those who in all probability saved her from a life of sin.

A communication from the Northwest lately informs us that one of the wards of our branch has been named a participant in a will left by her deceased foster-father,

in which provision has been made for her future. A baby, four months old, puny and sickly, was placed with a kindly, motherly woman, who spent many a weary night watching over the little waif. Her love and care have been rewarded, for to-day that baby is as fine a specimen of humanity as one could wish to see.

At the present time we have for adoption two sisters, aged six years and eight years respectively, taken from their mother, who was leading an immoral life. A great part of the Secretary's duty is to keep up correspondence with the energetic and untiring Superintendent, Mr. Kelso, who never allows the good work to drag; to keep in touch with other branches, answer inquiring letters, and to frequently communicate with foster-parents.

Clients of the Children's Aid Society.

In conclusion, it may not be amiss to refer in this report to the general moral tone of the town, in so far as it affects the juvenile part of the population, and it is gratifying as citizens to be able to state that Orillia is comparatively free from examples of youthful depravity. We do not presume to explain why so few cases came before the courts, but it is a fact that only two charges against youthful offenders were tried before the Police Magistrate—one of stealing, the other of fraud. The use of tobacco has decreased among young boys, owing to the law against selling it to minors. Truancy from school has been reduced to a minimum. Wanton destruction of property is rare.

William Grant, Treasurer, reported a balance on hand of about $130.

The election of officers resulted as follows:

President—George McKee.
Vice-President—H. T. Blackstone.
Treasurer—William Grant.
Secretary—J. D. Knox.
Agent—J. R. Reid.
Solicitors—F. G. Evans and M. B. Tudhope.
Committee of Management—Mrs. Alport, Mrs. W. Thomson, Mrs. Todd, Mrs. Lavallee, Mrs. T. Grant, Mrs. Shires, Mrs. Diggle, Mrs. Jupp.
Temporary Home Committee—Mrs. McGregor, Mrs. McKee, Mrs. R. Boothe.
Foster-Home Committee—Mrs. W. M. Harvie and J. D. Knox.
Auditors—Miss Overend and Mrs. Blackstone.

MEAFORD.

Dr. J. D. Hamill is the Agent of the Children's Aid Society at Meaford, and is always ready to give any necessary assistance, but during the past year not many cases have arisen calling for attention.

FORT WILLIAM.

The annual meeting of the Children's Aid Society of Fort William was held on January 25th, 1910. Mr. A. Snelgrove, the President, was in the chair and in dealing with the work of the past year stated that several children had been made wards of the Society and placed in foster-homes, and that the men and women who had opened their homes to them were bringing them up as their own children, and would not, on any account, part with them.

The report of the Secretary, Mr. E. Sprake Jones, referred to the visit paid to Fort William by Mr. Kelso, and the organization of the Society in consequence. Eighteen children had been cared for by the Society during the year. Of these a number were sent to Toronto, but foster-homes were procured for fourteen in Fort William. Eight families were supplied with clothing, etc., by the Society, eight Court sittings attended and three children placed in the hospital and eleven in St. Joseph's Home. Eight children are still awaiting placement. Donations had been received from the President, several private individuals and the Masons and Oddfellows of the city. An effort is being made to secure a substantial grant from the city, in order that the Society may be able to procure premises where children could be cared for temporarily. The Society had a case not long ago where a young lad was kept in jail for a couple of weeks, while awaiting disposal, so it can easily be seen that the need of a Shelter is urgent.

The report of the Treasurer, Mr. R. N. Card, showed the receipts for the year to have been $137.40, and the disbursements $102.43, leaving a balance of $34.97.

Votes of thanks were passed to Magistrate Palling and Chief Dodds for their kind assistance and to Drs. Manion, Withrow and Wodehouse for medical service volunteered free.

The officers elected for 1910 were as follows:

President—A. Snelgrove.
First Vice-President—C. H. H. Williamson.
Second Vice-President—O. C. Withrow.
(The city ministers were also appointed to act as Vice-Presidents.)
Secretary—E. Sprake Jones.
Treasurer—R. N. Card.
Agent—F. L. Trautman.
Representatives from the Churches—Mrs. T. A. Kennedy, Deaconess Elliott, Mrs. C. W. Jarvis, Mrs. Boyes, Mrs. Trautman, Mrs. Comer, Mrs. O. C. Withrow, Miss Leach, Mrs. James Murphy, Mrs. R. J. Manion and Captain and Lieutenant of the Salvation Army.

BARRIE.

During the past year the Children's Aid Society of Barrie has been active in looking after the interests of the children of the district. In his report, Mr. A. M. Hunter, the Secretary, states that ten children were made wards of the Society, seven of these having been placed in good foster-homes. Fourteen applications for children were received. About twenty complaints against parents or guardians were investigated, and about ninety interviews concerning children were held. Sixty letters on Children's Aid work were written. One boy who was placed in a foster-home was returned to the Society, but he has since been replaced in a good home, where he is giving the greatest satisfaction. While it has been necessary to remove a number of children from their parents, others have been greatly bettered in their own homes, thus rendering removal unnecessary. Some very encouraging reports are received from time to time of the wards of the Society placed in the early days of the work. One girl is in her third quarter in music and the people who adopted her cannot speak too highly of her. Mr. Hunter referred with gratitude to the assistance rendered to the Society by Chief King and his staff, and closed his report with an expression of profound regret concerning the death of the late President, Mr. H. H. Strathy, who was always such a help to the work in every way. The Society's Shelter is still under the care of Mrs. Thomas Burton, Innisfil Street, and at the time the report was presented there were six children in residence there.

The Society's receipts for the year were $211.41 and disbursements $171.50, leaving a balance of $39.91.

The following are the officers:

President—Donald Ross.
First Vice-President—Rev. D. D. McLeod.
Second Vice-President—Rev. I. G. Bowles.
Treasurer—Mrs. M. Burton.
Secretary—A. M. Hunter.
Hon. Solicitor—C. W. Plaxton.

MIDLAND.

The Children's Aid Society of Midland has not had a great deal to report during the past year, but the officers are ready at all times to take action where necessary in the interests of the children.

The following is a list of the officers:

Hon. President—James Playfair.
President—W. J. Parkhill.
First Vice-President—Rev. Father Barcelo.
Second Vice-President—Mrs. (Capt.) Macauley.
Secretary—Robert McCracken.
Treasurer—J. F. Goodfellow.
Agent—Chief Bell.
Solicitors—W. Finlayson and F. W. Grant.
Physicians—Charles Clark and R. Raikes.
Executive—The town clergy and Messrs. F. W. Jeffery, J. Morgan, N. E. Luck, Mrs. Taylor and Mrs. Tremeer.

GRAVENHURST.

The attendance at the annual meeting of the Gravenhurst branch was not large, owing to the fact that a number of other meetings were being held the same evening, but the report presented showed that the Society is in a good condition financially. It has done excellent work in the past and looks forward with increasing hope to the care of the young people of the district.

The officers are:

President—W. H. Gallichan.

Vice-President—Dr. Grant.

Secretary—Mrs. Minns.

Treasurer—Joseph Graham.

Committee of Management—Messrs. T. E. Williams, F. Slater, Dr. Cartwright, A. Sloan, Rev. T. Edwards, Rev. A. P. Banks, S. Lamb, Rev. D. A. McKeracher, J. Groves, T. Hobbs, Mesdames Mickle, Gossage, McPhee, Sharpe, Gallacher, Ryan, Graham, Brennan, Fournier and Miss Slater.

KENORA.

The following is a report of the work accomplished by the Children's Aid Society of Kenora, as presented by the Secretary, Mrs. J. P. Earngey:

Since sending in my last report we have had a Probation Officer appointed, and, although it has not been necessary to take action in many cases in connection with Children's Aid work, yet, in minor cases, the Society has done considerable work.

A baby girl about two weeks old was found in a little wooden box on Coney Island, just across from the town, and inside of a day there were three people offered to adopt it. A splendid home was found for the little deserted one.

A boy, who was sentenced to the Industrial School, had his sentence commuted, and he is adopted by a farmer in Manitoba, and we hear good reports from him.

We had the pleasure of hearing addresses by Mr. Kelso and Mr. Thomson on Children's Aid work, which were instructive and interesting.

A young man, a little over thirty, who had a wife and four small children, has been suffering from rheumatism, and not able to work since spring. A collection was taken up and $243.00 realized, and he was sent to Harrison Hot Springs, where he has greatly improved.

"Each man is here to help another,
To give where charity is due;
And to all men to be a brother
And to the Lord a servant true."

The above could hardly be better exemplified than by the generosity of the people of Kenora.

The officers of the Society are as follows:

President—Mrs. M. J. N. Pither.

First Vice-President—Mrs. J. W. Humble.

Second Vice-President—Mrs. Joseph Johnston.

Secretary—Mrs. J. P. Earngey.

Assistant Secretary—Mrs. W. G. Cameron.

Treasurer—Mrs. James Horan.

Convener of Relief Committee—Mrs. James Sherman.

Hon. Solicitors—Mr. McKenzie and Mr. J. A. Kinney.

Probation Officers—Rev. Mr. Thomas and Mrs. Humble.

Board of Management—Mrs. James Sherman, Convener; Mrs. Hose, Cameron, Parsons, Cuthbert, McKenzie, Humble, Johnston, Beaudro, Miss Fife and Mrs. Lofthouse, Bishop Lofthouse, Mr. J. Johnston, Rev. Mr. McKim, Mr. A. Parsons, Rev. Mr. Thomas, Rev. Mr. Spence, Sheriff Humble, Rev. Mr. Little, Mr. Snider and Mr. J. Kron.

HUNTSVILLE.

The Huntsville Children's Aid Society, formed about a year ago, is now in a flourishing condition, and held its annual meeting on December 8th, 1909, great interest being shown in the work by those present.

During the year the following matters received attention: Five children belonging to one family were removed from poor and destitute surroundings and sent to the Provincial Shelter at Toronto that foster-homes might be found for them. Two young girls, whose home surroundings were harmful and perilous, were, with the consent of

Children in need.

their mother, placed in good Christian homes, where they will have every chance to grow up well. Three children were taken from an irresponsible mother and sent to Mr. Kelso. These little ones had not only been partially starved, but had been ill-treated as well. Good homes have been found for them, and they are now happy and contented. Two public meetings were held, one being addressed by Mr. M. K. Richardson, of Flesherton, and one by Rev. C. R. Miller, of Berlin, both Agents of Mr. Kelso. There were also eight committee meetings held during the year. In August Rev. C. W. Watch who had been chiefly instrumental in forming the Society, left Huntsville, and Rev C. W. Balfour was appointed President and Chairman in his place.

Following is a list of the officers of the Society:

President—Rev. C. W. Balfour.

Secretary-Treasurer—Mrs. John Whiteside.

Agent—Chief Watson.

Hon. Solicitor—Mr. Howells.

Committee—The ministers of the town and Mrs. Turnbull, Mrs. Bezett, Mrs. Hart Proudfoot, Mrs. Highstead, Mr. H. E. Rice and Mr. B. P. Clarke.

SAULT STE. MARIE.

During the past year the Children's Aid Society of Sault Ste. Marie attended to a number of cases in the district, and is ready at all times to take action in the interests of the children. The Society is hampered in its work, however, by lack of funds and by not having an agent who can devote all his time to the work. There is also urgent need of a Shelter.

The officers of the Society are:

President—Mr. William R. Cunningham.

Vice-Presidents—Mr. D. I. Millar, Mrs. W. H. Ewing and Mrs. C. Kocot.

Treasurer—Mr. George Williams.

Secretary—Mr. Fred. A. King.

Inspector—Mr. I. J. Downey.

Hon. Solicitor—Mr. P. T. Rowland.

COLLINGWOOD.

The annual meeting of the Children's Aid Society of Collingwood was held on February 25th, 1910.

The report of the agent, Mr. Edward Ward, was presented, and showed that although no children had been placed in foster-homes during 1909, the influence of the Society was producing beneficial results in the town, as was evidenced by many families keeping their children better cared for with respect to food and clothing. There is also a more regular attendance at the schools, the annual report showing an increase of fifty-nine over that of 1908, with a lower registration. Excellent reports have been received of the children placed in foster-homes, with only one exception.

The following officers were elected:

President—Rev. W. J. Pady, B.A.

Vice-Presidents—Rev. W. K. Hazer, B.A., Rev. J. A. Cranston, M.A., Rev. Mr. Macnamara and Rev. Mr. Assiter.

Agent and Secretary-Treasurer—Edward Ward

Hon. Counsel—W. T. Allan.

Hon. Photographer—A. S. Webb.

Committee—Mesdames Cunningham, Cottrell, Ward, Clark, Hopps, Milligan, O'Brien, E. Ward, Poehlam, Nolan, Miss N. Ward, Mr. Martin Walker.

COBOURG.

The Children's Aid Society of Cobourg is still actively engaged in looking after the interests of uncared-for children, though it is gratifying to know that not many cases of neglect have occurred in the district during the past year. In November a visit was made to Cobourg by Rev. W. A. Gunton, who gave addresses on the work, investigated complaints, etc. With his assistance three children were committed to the care of the

Society. One of these was placed in a good foster-home and the other two were put out to board at the expense of the father, who wished to be given an opportunity to show that he could provide for them. A little girl, a ward of the Port Hope Society, was provided with a foster-home, and she and her foster-parents are delighted with each other. A bright, healthy boy, three years of age, was committed to the guardianship of the Society, owing to the intemperance and ill-health of the father and the inability of the mother to support him, and he is available for a good home.

The officers of the Society are:

President—Mr. J. Burchill.

Vice-Presidents—Mrs. H. T. Holland and Mrs. J. T. Field.

Secretary and Treasurer—Mr. J. W. Bickle.

Hon. Solicitor—Mr. H. F. Holland.

Agent—Mr. J. C. Ruse.

WALKERTON.

The annual meeting of the Children's Aid Society of Walkerton and the County of Bruce was held on the afternoon of October 29, 1909, in the Town Hall. The reports submitted showed that considerable work had been done during the year. The Society has now 41 wards, some in benevolent institutions, but the most have been placed in foster-homes. The Society writes to all the foster-homes each year, and in many instances receives letters from the children, as well as from the foster-parents. So far as we have gathered from these letters, and also from reports made by the Inspectors of the Department in Toronto, all our wards are happily situated.

The president, Mr. Shaw, submitted an exhaustive report of the work and financial position of the local Society. This report was unanimously adopted and ordered to be presented for consideration at the January session of the County Council. It was arranged that a deputation appear before the Council in support of a grant of $300, so as to enable the Society to employ an agent to organize the work throughout the County, and to place it on a permanent basis.

The officers were re-elected and are as follows:

President—A. Shaw, K.C.

Vice-Presidents—M. McNamara, A. W. Robb and Miss Roether.

Secretary-Treasurer—J. Morgan.

Directors—The Officers, and Mrs. McNamara, Mrs. D. Robertson, Mrs. L. C. Benton, Mrs. C. F. Bate, Miss A. Robertson.

A. Shaw, K.C.,
President.

J. Morgan,
Secretary.

WELLAND.

During the past year the Children's Aid Society of Welland investigated conditions in seven homes. In two of these the chief fault was lack of cleanliness, illness resulting. A doctor was sent to one home and a sanitary inspector to the other, with the result that there was considerable improvement. In two other families parents were supposed to be habitual drunkards, and in one of these three of the children had been found guilty of petty thefts. From this family one boy had previously been sent to the Industrial School. Owing to the interest shown by the Society in these families a marked improvement was soon seen, which has since continued. In the case of another

family it was found necessary to remove two children, who have since been satisfactorily provided for. Another case is still under consideration. Four meetings were held by the Society during the year.

The following are the officers:

President—Mr. J. W. Marshall, B.A.
Vice-Presidents—Mr. J. S. O'Neal and Mr. J. R. Gilmour.
Treasurer—Miss Laura Yokom.
Secretary—Mr. John Flower.

INDUSTRIAL SCHOOLS

There continues to be a general increase in the number of children placed in the Industrial Schools, the number on the first day of the year being 433, as compared with 408 at the same time a year previous. This increase is somewhat natural in view of the rapid growth in population, and is, in fact, exceedingly low, the good work of the Children's Aid Societies helping to reduce the number requiring institutional care.

The Schools are well conducted, and every effort is made to influence and permanently benefit the young people passing through them. Just as soon as conduct and progress warrants homes are found, and there has been no disposition to unduly detain children. An excellent arrangement exists between the Schools and the Children's Aid Department whereby suitable homes and situations with subsequent supervision are provided.

The pupils are maintained at a per capita cost of $3 per week. The Government contributes $1.75 per week and the municipality $1.25. The following table gives the amount paid by the Government during the past three years:

Government Grants.

The grants made by the Government to the Industrial Schools during the past three years were as follows:

	1907.	1908.	1909.
Victoria Industrial School.....	$20,035 99	$21,170 37	$23,068 26
St. John's Industrial School	7,336 25	6,858 25	7,038 07
Alexandra Industrial School	4,748 00	7,188 50	8,267 43
St. Mary's Industrial School	2,197 33	1,660 76	1,633 75
Totals	$34,317 57	$36,877 88	$40,007 51

VICTORIA INDUSTRIAL SCHOOL.

J. J. Kelso, Esq.,

Superintendent of Neglected and Dependent Children.

Sir,—I beg to report as follows for the Victoria Industrial School for the year ending December 31st, 1909:

School Population.

The number of boys in attendance on December 31st, 1908, was 232. The number of boys committed during the year was 144, and 27 were returned. Total 171. The number who were paroled, transferred, etc., during the year was 158. Number in attendance December 31st, 1909, was 245.

Of those paroled 99 were sent to foster-homes, or were indentured to farmers.

Of those in attendance on December 31st, 92, or 37%, are from Toronto, 20 are from Hamilton, 9 from York County, 7 from Ontario County, 6 from Victoria County, 7 from London, 4 from St. Catharines, 5 from Brantford, 2 from Guelph, 4 from Brockville, 7 from Simcoe County, 7 from Northumberland and Durham Counties, 3 from Norfolk County, 4 from Lincoln County, 5 from Wentworth County, 4 from Elgin County. 2 from Prince

Edward County, 3 from Lanark County, 7 from Middlesex County, 4 from Haldimand County, 3 from Bruce County, 3 from Hastings County, 2 from Dufferin County, 3 from Grey County, 2 from Peterborough County, 3 from Leeds and Grenville Counties, 2 from Waterloo County, 3 from Welland County, 3 from Parry Sound District, 2 from North Bay Town, 2 from Kenora Town, 3 from New Ontario, 1 each from the Counties of Kent, Brant, Lennox and Addington, Essex, Wellington, Halton, Cities of Fort William, Windsor, Ottawa and Niagara Falls, Towns of Sudbury and Gravenhurst.

Two hundred and eighteen have been in continuous residence since their committal to the school and 27 have been out and returned for further periods of detention. Some of these have been returned pending their removal to other homes; some have broken the terms of their parole, and a few have been sent back by the Courts.

Of the number who have not been paroled, 134, or 60%, have been in the school less than a year; 45, or 20%, have been in from 1 to 1½ years, or 80% less than 18 months; 23 have spent from 1½ to 2 years, 7 have spent from 2 to 2½ years, and one only has been in 3 years.

Of those who have been paroled and have been returned only 11 have spent more than three years in the school, and some of these have been out and in several times during the past five or six years.

The average term in the school of those paroled during the year 1909 was one year and eight months. This does not appear too long a period of detention in order to train and develop a boy in character, teach him some trade and give him such education as he needs. A large number of these lads are very backward in their schooling, many of them from 14 to 16 years of age, reading only in the first and second book classes.

One of the important things the school stands for is to give backward, truant boys a chance to receive at least the rudiments of a Public School education. This, and the still more important task of training and developing his character, cannot be accomplished in the large majority of the boys in a less time than two years. Their chief defects are dishonesty, untruthfulness and lack of will power; neither are they very industrious; so that to our other responsibilities is added the task of training them in habits of work. While it is not desirable to detain a boy unnecessarily, still sufficient time should be given to prepare a boy as well as possible for the struggle of life.

Standing in the School of Letters.

At the time of their admission to the school 10 of them could not read or write, 32 were in the first book, 53 were in the second book, 34 were in the third book, 15 were in the fourth book.

These figures indicate plainly the great lack of many of these boys in their education, due largely to their habits of truancy or the neglect of parents in not sending them to school.

Causes of Committal.

Seventy-seven were committed for stealing and burglary, 16 were committed for vagrancy, 46 were committed for general incorrigibility, 2 were committed for assault, 1 was committed for incendiarism, 1 was committed for disorderly conduct, 1 was committed for carrying arms. Total 144.

Parentage.

Eighty-nine had both parents living, 8 had neither father nor mother, 14 had no mother, 7 had no father, 10 had stepfathers, 7 had stepmothers, 4 had both parents separated, 3 had parents in Asylum, 2 had parents deserted.

Review of Work.

The work in an institution of this kind does not vary materially from year to year. Human nature does not change. Boys come and go and they are not different this year from what they were in former years; the same characteristics, home environments

and causes that have led to their residence in the school. The methods employed for their training are limited in their scope. While we have been improving the material conditions of our school, making for the comfort and convenience of the boys, still it has not been possible to increase the working efficiency of shop, farm or school to any appreciable extent. True, we have a better-equipped workshop, an up-to-date school building and cottages that compare favorably with those of similar institutions. All these make the conditions of school life more congenial. Had we a larger farm we could train more boys in this important work and we would not be under the necessity of buying our grain and hay as we now do. There is usually a large demand from farmers for trained boys. Our school would be rendering a service to the farming community were we able to send out more boys with a practical knowledge of farm work, care of stock, etc. To do this with more success we should have a much larger farm. We have about 50 acres available for cultivation. We need 100 more. In this connection I would like to urge the need for more stable and barn accommodation. Our present buildings are quite inadequate for our needs. They are also too close to our school proper.

There should be provision made for the keep of 30 milk cows, so that plenty of milk may be had for our growing boys. This and a swimming bath are now the most urgent needs of our school. A sum of $10,000 would be sufficient for both.

Industrial Departments.

The splendid fireproof workshop erected during the year is well adapted for our work. Our shops are large and well-lighted. This building contains the departments of tailoring, shoemaking, printing, carpentering, laundry and our heating and lighting plant. About 40 boys take training in each of the tailor and shoe shops, 20 in our class in printing, 20 in carpentering and painting.

All the school and band uniforms, overcoats, boots and house slippers are made by our classes in these departments. We have a printing department designed to give our young printers a practical knowledge of typesetting, composition and press work. The school stationery, a monthly school magazine, "Our Boys," and considerable local job work keep this class constantly employed. Works of construction and repair, painting, glazing, etc., are under the direction of the carpenter department.

The training the boys receive is a very practical one and cannot fail to be of service to them in after life, no matter what occupation they may follow. The boys display a commendable energy and interest in the work of all these industries.

A small number of boys receive training in the engineering department. In the bake-shop are made all the bread, cakes, etc., required in the school. Smaller boys find employment in the care of the dining-room, kitchen and cottages. The system that provides for a half-day in shop and a half-day in school, is a good one. Boys do not tire of either.

Education.

Our school of letters has to do with the intellectual life of the boy. The majority of the boys have been persistent truants from school; hence they are below the average Public School boy in attainments. The work of the teacher is necessarily slow and often very discouraging. Teaching ability, tact, sympathy, patience and perseverance are essential characteristics of the teachers. We have three excellent teachers, maintained by the Board of Education of Toronto, and a fourth will be added at an early date. This will make for better classification and more individual attention to the backward pupils. Reading and literature, writing, spelling and arithmetic are the subjects that engage most of the study hours.

Military Drill.

As a means of cultivating prompt and willing obedience, self-control and physical culture, the boys receive instruction in military drill. Too much stress cannot be put upon this as an important factor in a boy's training. Our Cadet Corps is inspected annually by an officer appointed from Military Headquarters. Very high praise was given the Cadets by the Commanding Officer at the last inspection for the skill with which they performed the various evolutions and manual exercises. The Boys' Brass Band has become a fixed part of our school life. Their performances last season were very creditable and won very warm encomiums wherever they performed.

Play.

Ample provision is made for the development of this part of a boy's nature. Base-ball, football and other sports are freely indulged in during the sporting season; while in the winter the skating rink resounds with the happy shout and laughter of boys intent in the ever-fascinating exercise of skating. Our large covered rink, known as the "Neil Currie Memorial Rink," has proved a great blessing to the school.

A grant of $20,000 from the Government made it possible for us to finish and equip our workshop and make additions to our kitchen, Deputy-Superintendent's residence and No. 3 cottage. In the latter we have now a suite of rooms for hospital accommodation. Appended is a statement of receipts and expenditure for the year.

I have the honor to be, Sir,

Your obedient servant.

C. FERRIER.

Receipts.

Municipalities	$17,249 27	
Government grants	23,068 26	
Printing	158 35	
Boys' Band	257 50	
Boys' parents	83 00	
		$40,807 38

Expenditure.

Provisions	$8,488 22	
Farm	1,615 23	
Clothing	6,134 87	
Furnishings	444 30	
Household supplies	674 42	
Fuel and light	3,973 73	
Printing	208 50	
Repairs	915 39	
Salaries	9,386 76	
Insurance	949 35	
Interest	1,400 00	
Miscellaneous	2,968 64	
Boys' Band	148 35	
		$37,307 76

LETTER FROM CHIEF SCHOOL INSPECTOR.

February 2nd, 1910.

J. J. Kelso, Esq.,

Parliament Buildings, Toronto.

Dear Sir,—I have pleasure in certifying that the Victoria Industrial School and the Alexandra School are taught by teachers appointed by the Board of Education, and regularly inspected by the Inspectors. Mr. Elliott inspects the Victoria Industrial School, and Mr. Bruce the Alexandra Industrial School. Both institutions are doing excellent work.

Yours truly,

James L. Hughes,

Chief Inspector.

SCHOOL INSPECTOR'S REPORT.

Toronto, Feb. 20th, 1910.

J. J. Kelso, Esq.,

Supt. Neglected Children's Branch,
Parliament Buildings, Toronto.

Dear Sir,—I beg to report that on the 2nd day of December, 1909, I visited the Victoria Industrial School, Mimico, and spent the whole day acquainting myself with the organization and management of the school and the teaching of the academic and manual department.

The academic work is under the supervision of three teachers, viz.:—Mr. Geo. Richardson, III. and IV. Grades; Miss Brown, II. Grade; and Miss McGregor, I. Grade. During my visit Miss Brown was absent on sick leave, but her place was ably filled by Miss Winn, an occasional teacher from the City Schools. I find the staff, without an exception, doing most excellent work both in discipline and actual teaching. There was not visible any sign of coercion within the classrooms, the work being undertaken in a spirit of happiness.

The alternation of academic and manual work was carefully provided for, each class (excepting the case of the very youngest pupils) being classified into two divisions, the first of these taking manual work for half a day, while the other half division takes the academic.

The standing of the pupils in the essential subjects—arithmetic, reading and writing—is most creditable considering the self-imposed and other handicaps under which this class labor.

I am also pleased to report that throughout the Institution there pervades a healthy moral influence which is doing much to transform these unfortunates from mere parasites into useful citizens.

As to the work of Mr. Ferrier, the Superintendent of the School, I cannot speak too highly. He is a man possessed of a rare admixture of sympathy and strength, which at once checks license and encourages noble effort. If any one can make "men" of these boys, Mr. Ferrier will.

All of which is respectfully submitted.

W. H. Elliott, B.A.,

Inspector of Schools, Western District.

ST. JOHN'S SCHOOL.

J. J. Kelso, Esq.,

Superintendent of Neglected and Dependent Children.

Sir,—I have the honor to submit the following report of the St. John's Industrial School, East Toronto, for the year ending December 31st, 1909.

There were 69 pupils in attendance on January 1, 1908; in the course of the year 75 were received, including a few returned for further training; placed out were 66; one was accidentally drowned. At the close of the year there were 77 in the school.

The following supplied more than one pupil:

Toronto, 24; Goderich, 3; North Bay, 3; Kenora, 2; London, 2; Berlin, 2; Windsor, 2; Niagara Falls, 2; New Liskeard, 2; St. Catharines, 2.

Ages of pupils received: 1 of 8 years, 2 of 9 years, 6 of 10 years, 12 of 11 years, 10 of 12 years, 19 of 13 years, 8 of 14 years, 10 of 15 years, 5 of 16 years, 1 of 18 years, 1 of 19 years. Average age, 12.8.

General good health prevailed in the school, and the deportment of the pupils was more satisfactory than heretofore.

Outdoor games were encouraged by inexpensive rewards given to those that excelled A large and handsome handball court, at a cost of $2,000, was erected this year. It is roofed, and divided so that sixteen contestants can play simultaneously. The popularity and utility of handball were instantly recognized. As a result of the games, it was noticed that progress was made in a virtue which is not common in boys—self-control.

During the Christmastide, an instructive and amusing evening's entertainment was given to the pupils and their teachers through the kindness and forethought of Mr. J. J. Kelso, Superintendent.

With a view to protect the School from undesirable buildings that possibly would be erected adjacent to it, as well as to add to the property of the institution, a strip of land containing about three acres, by the side of the avenue in front of the school, was acquired. Upwards of two hundred and fifty trees were planted in the Park and on other parts of the property. The workshops were moved to the old mansion located in the Park, and in consequence the laundry premises are considerably enlarged. Owing to the expense incurred by the erection of the ball alley and the acquisition of new land, it was found impossible to build the gymnasium spoken of in last year's report. Yet the gymnasium is a desideratum.

On April 12, His Excellency the Apostolic Delegate, accompanied by the Archbishop of Toronto and several priests of the city, inspected our school and premises, and addressed the pupils in words of counsel and encouragement. There is reason to believe that the distinguished visitor carried with him favorable recollections of his visit.

I am, faithfully yours,

Brother Abnis.

The receipts and expenditure for the year ending December 31st, 1909, were as follows:

Receipts—To cash on hand and in bank, $9,017.55; municipalities, $5,303.17; Government grant, $6,854.48; other sources, $208.94; interest on bank balances, $177.55; bank overdraft, $759.72—$13,303.86. Total, $22,321.41.

Expenditure—By wages, $1,673.55; building, $4,893.92; land, $8,583.56; house expense, $7,170.38. Total, $22,321.41.

SCHOOL INSPECTOR'S REPORT.

J. J. Kelso, Esq., *Toronto, January 29th, 1910.*

Superintendent of Children, Parliament Buildings.

Sir,—This is to certify that I paid two official visits to St. John's Industrial School during the year 1909. At the first visit I found 80 pupils present, and 85 at the second.

In most cases the early education of those present had been neglected, thus the scholarship was not of a very high order. This neglect of early training, together with the frequent changes among the pupils, makes regular school work rather unsatisfactory.

All the subjects on the school curriculum receive attention; special stress, however, is put upon reading, writing, spelling and composition. Both teachers in charge are legally qualified, and, when one considers the circumstances in connection with each pupil, it is but fair to say that very satisfactory work is being done.

In addition to the ordinary school work, instruction, under special teachers, is given in carpentry, shoe-making and tailoring.

J. F. Power,

Inspector of Separate Schools.

ALEXANDRA INDUSTRIAL SCHOOL.

J. J. Kelso, Esq.,

Superintendent of Neglected and Dependent Children.

Sir,—I have the honor to submit the report of the Alexandra Industrial School for Girls, East Toronto, for the year ending December 31st, 1909.

There were 85 girls in attendance on January 1st, 1908, and 92 at the close of the year. Forty-two entered during the year and five were returned, making a total attendance of 132. Of this number 42 left the school, a few of whom were allowed to return to the homes of their parents, the remainder being placed in foster-homes. Two were committed to other institutions.

Of those who were committed 2 were 18 years of age, 8 were 16 years of age, 9 were 15 years of age, 11 were 14 years of age, 7 were 13 years of age, 2 were 12 years of age, 2 were 11 years of age, 1 was 10 years of age.

Whence received: Twenty were committed from Toronto, 3 from Hamilton, 2 from each of the following Counties: Grey, Welland, Waterloo and Hastings; 1 each from Counties of Leeds and Victoria, and Cities of London, Kingston and Chatham.

Causes of committal: Twenty-eight were committed for vagrancy, 14 for incorrigibility.

During the year a great deal of good work has been undertaken and accomplished, not only in the erection of new buildings, but in the improvement of our old buildings and the beautifying of the premises. Our new barn, modern in every particular, has since its recent erection been a great comfort and a satisfaction. Included also in the list of completed improvements are a new fence, which surrounds the entire grounds, and the new driveway through the central part of the grounds.

A large, new building, which has been in the course of erection since last June, is now at the point of completion, and we anticipate its formal opening early in the new year. It has been splendidly planned and constructed with a view to the health and comfort of the girls, and provides for some 25 separate sleeping apartments.

The interior of the second stories of cottages Nos. 1 and 2 has also been completely remodelled. An entirely new system of plumbing has been installed, adding greatly to the convenience, sanitation and comfort of these cottages. Additional expenditure in the renovation of cottage No. 1 has fitted it to be utilized in future especially for returned and the more incorrigible girls. We might mention also a slight but much needed alteration in Marcella Hall: by removing a partition we have now a room sufficiently large for the accommodation of all on occasions such as choral practice, impromptu concerts, etc.—a trivial improvement, but of important consequence. These, with the addition of a new central septic tank and a new system of electric lighting, both in the course of being installed, complete a list of changes and additions which we thoroughly appreciate and for which we are sincerely grateful.

The work of the school has proceeded along the usual lines. In every department the girls have shown a commendable spirit, and the work has been good, considering

the difficulties under which they were laboring owing to the alterations and building being carried on during the greater part of the year. Each building is officered with conscientious, experienced women, and the girls are intelligently supervised in every kind of womans' work—mending, saving, fancy work, cooking, laundry work, etc.

In the school of letters, the privilege of writing on the entrance examinations has proved a practical incentive to faithful effort. A class of five wrote on the entrance exams. last June, and all were successful. Too much importance cannot be attached to the value of scholastic training (rightly directed) in its power to strengthen and develop those qualities which make for noble womanhood. In music we are fortunate in having the services of a professional musician. Regular choral instruction is given, and special concerts are prepared and given by the girls from time to time.

Proper care and attention is given to health and recreation of the girls. Consequently, the health of the school has been good, there being no cases of serious illness. We lament the fact that there is yet no provision made for gymnastic and calisthenic training. During the past summer months the girls have been chaperoned to the lake for bathing and swimming two and three times weekly.

The object of all our training—domestic, physical and mental—is that those who have gone out from our instruction may be good principled Christian young women. So every advantage is given the girls that they may develop spiritually by personal contact, Bible study, church services, and personal sympathy and help of outside friends.

We have some girls who are defective and who have proved themselves to be wholly incapable of keeping from falling into vicious habits in the world. This class has to be cared for all their days. They are able to work and would be self-supporting in an institution properly equipped for such work, but we can do but little for them under the circumstances.

Thanking you for your sympathy and aid in furthering the good of this branch of your work,

I have the honor to be, Sir,

Your obedient servant,

JOSEPHINE PARROTT.

Receipts.

To cash from municipalities	$5,148 57	
" cash from girls' parents and guardians	654 00	
" cash, Ontario Government grant	8,140 81	
		$13,943 38

Expenditure.

By provisions	$2,637 61	
" salaries	2,693 95	
" clothing	718 03	
" fuel and light	850 90	
" general furnishings	459 59	
" insurance	379 50	
" garden and stock, etc.	928 99	
" repairs	241 26	
" new fence around grounds	618 95	
" miscellaneous	845 57	
		$10,374 35
Balance at credit		$3,569 03

SCHOOL INSPECTOR'S REPORT.

Toronto, Ont., Feb. 20th, 1910.

J J. KELSO, Esq.,

Supt., Dept. of Neglected Children for Province of Ontario.

DEAR SIR,—I inspected the Alexandra School for Girls on Dec. 17th, 1909.

Teacher, Miss Margaret McGowan.

Her teaching power, excellent.

Her discipline, excellent. Teacher has apparently no difficulty in getting and retaining good order.

Number on school register, 90 girls.

Classes, 1st, 2nd, 3rd, 4th grades. There were 24 in the 4th grade and 66 in the other three grades.

I examined the classes in arithmetic, reading, spelling, writing and language, and found them good in each subject.

The work of the classes in their seats was excellent, no "marking" time at all.

N.B. I may add that five girls from this Institution passed the High School Entrance Examination in June last—a most remarkable record, all things considered.

Yours sincerely,

E. W. BRUCE,

Inspector.

ST. MARY'S INDUSTRIAL SCHOOL.

At the close of the year 1909 there were in residence in St. Mary's Industrial School nineteen girls, whose ages ranged from ten to nineteen years the average age being about sixteen years.

The cities and towns from which they were committed were as follows: Toronto, 10; Ottawa, 3; Hamilton, 2, and Haileybury, London, North Bay and Tilbury, 1 each.

The school authorities report that as a result of the training received in the institution these girls, with a few exceptions, show a marked improvement and a desire to lead better lives when they return to the world. The majority of them are industrious and ambitious and the two or three exceptions are weak-minded young people from whom not a great deal can be expected and who will probably never do well unless kept under institutional restraint. A very interesting feature of the work is that in a list of twenty-nine pupils discharged from the school during the past five years, seventeen are reported as being in good situations and doing well in every respect, while seven are married and have comfortable homes of their own. Three have returned voluntarily to the school, and two, both said to be weak-minded, have done badly. The girls show their gratitude for the care taken of them by writing and visiting the school frequently after their discharge, which is very encouraging to those who have tried to help them and of great benefit to these young people themselves.

The pupils are instructed in ordinary school work by thoroughly qualified teachers, and in addition are taught the duties of practical housekeeping, while a few who show a special desire and aptitude for music and fancy needlework are instructed in these branches as well.

The health of the girls has been good during the year.

SCHOOL INSPECTOR'S REPORT.

J. J. KELSO, Esq., *Toronto, January 29th, 1910.*

Toronto.

SIR,—This is to certify that I paid two official visits to St. Mary's Industrial School, Toronto, during the year 1909. The first visit was on June 22nd, when 35 children were present. The second visit was on December 20th, when 34 were present.

The class is in charge of a Normal trained teacher, and the work done is most satisfactory, especially when one considers the nature of the school. In addition to the ordinary school subjects, sewing and needlework receive attention.

J. F. POWER,

Inspector of Separate Schools.

A Pyramid of Neglect.

JUVENILE IMMIGRATION.

Owing to advancing years and to changes made by the Department of Agriculture, Mr. P. Byrne, for so many years Agent of the Government at Liverpool and Inspector of child immigrants, has retired from active service. He was greatly interested in the young people who passed through his hands, and always had an encouraging word for those who were embarking for the new world.

As close attention is now given by the Dominion Government to this branch of work it may not be necessary for the Provincial authorities to maintain a separate inspection The Agencies throughout Ontario are now regularly inspected by Mr. G. Bogue Smart, Dominion Inspector of Immigrant Children, who also is responsible for furnishing reports to the home authorities of the progress of English children in Canada.

ONTARIO GOVERNMENT AGENCY,
7. James Street, Liverpool.
November 17th, 1909.

J. J. KELSO, Esq.,

Superintendent, Neglected and Dependent Children, Toronto.

DEAR SIR,—I have the honor to report that in my capacity as examiner of child-emigrants, I have officially inspected during the past season thirty-eight parties who were sent out for settlement in Ontario by the following training homes in this country, namely:

Barnardo's Boys' Home, Stepney, London.
Barnardo's Girls' Home, Barkingside, Essex.
Catholic Emigration Association, Birmingham, and branches.
Manchester Orphan Home, Strangeways and Cheetham Hill.
Mrs. Birt's Sheltering Home, Liverpool.
Wesleyan Home, Bonner Road, London, and branches.
Miss Macpherson's Home, London.
Miss Smyly's Home, Dublin.
Mr. Fegan's Home, Southwark, London.
Waifs and Strays Society, London.
Quarrier Homes, Bridge-of-Weir, Scotland.
Salvation Army, London.
Mrs. Wallis, London Bridge, London.

The total number of children in the several parties was 2,075, against 2,071 last year. The boys number 1,435 and the girls 640. Increase of boys, as compared with last year, 49; decrease of girls, 45.

I have the honor to be,

Your obedient servant,

P. BYRNE.

NOTE—As Mr. Byrne is now retiring from active service it is a pleasure to state that since the year 1897 he has acted as Special Examiner of British children intended for Ontario, and discharged the duty with marked efficiency. He was a courteous and painstaking official and was careful to see that only the best class of children was sent to this Province.

CHILDREN RECEIVED DURING THE YEAR.

The Ontario agencies report the following numbers received:

Agency.	Boys.	Girls.	Total.
Dr. Barnardo's Homes	554	334	888
Catholic Emigration Association	232	85	317
The J. W. C. Fegan Home, Toronto	104	....	104
The Macpherson Home, Stratford	133	61	194
The Marchmont Home, Belleville	30	16	46
The Church of England Society	....	17	17
The Fairknowe Home, Brockville	80	59	139
The Salvation Army	38	1	39
The Coombe, Hespeler	24	6	30
The Stephenson Home, Hamilton	91	3	94
Mrs. Birt's Distributing Home, Knowlton, Que	88	73	161
	1,374	655	2,029

DR. BARNARDO'S HOMES.

Mr. Alfred B. Owen, General Superintendent of the Canadian Department of Dr. Barnardo's Homes, reports that during the past year they have received from England 554 boys and 334 girls, these children having come out in four parties. This number is an advance upon the total of the preceding year of 45. Out of the 888 new arrivals about 400 have been boarded out in foster-homes, where their maintenance will be paid for from the funds of the institution while their education continues. The reports of the children placed out in former years have been, on the whole, highly satisfactory. Cases of ill-treatment have been extremely rare, while instances in which the warmest affection exists between the children and their guardians are many. A pleasant feature of the work is that many of the boys and girls yearly assist in bringing out to Canada relatives from England. There is a large staff employed and twelve Visitors are constantly engaged in seeing that these young people receive fair treatment in their foster-homes. The head office of the Home is at 50-52 Peter Street, Toronto, while the Girls' Home is at Peterborough, the latter being known as The Margaret Cox Home for Girls. This institution also maintains an Agency in the West, under the direction of Mr. E. A. Struthers, Bannerman Avenue E., Winnipeg, Man.

MARCHMONT HOME.

Rev. Robert Wallace, Superintendent of the Marchmont Home, Belleville, reports that the work of his institution has fallen off very much during the past year. Most of the children received by his Agency come from Manchester, England, and he reports that there is a strong prejudice in that city against emigration. As it is the centre of the cotton industry, large numbers of boys and girls are needed for the light work in the mills, and on this account many object to the children leaving the country. Only forty-six children have been received this year—thirty boys and sixteen girls, their ages ranging from nine to nineteen. The staff of the Home consists of Mr. and Mrs. Wallace, a Visitor and a Stenographer, with, of course, helpers in the household duties.

FAIRKNOWE HOME, BROCKVILLE.

The Fairknowe Home, Brockville, which is the Canadian receiving home of the Orphan Homes of Scotland, founded by William Quarrier, received during the year, from Bridge-on-Weir, Scotland, two carefully selected parties. One party, consisting of eighty

boys, arrived in April, and the other, consisting of fifty-nine girls, came in July; total 139. The average age of these children was from twelve to thirteen years. As the Home had 511 applications for girls and 385 applications for boys, these young people were all quickly placed in good homes. There were thirty-four marriages reported among the older wards of the Home, and news was received of the death of six men and one woman, who all had been in Canada from thirteen to twenty-three years. Five went home to the Old Country, two on their own account, one for a visit, one to an aunt, one for further training, and one for misbehavior. Three Visitors were employed during the year, in addition to visits paid by the Home Director, Pastor Findlay, of Glasgow, and Mrs. Findlay, Mrs. Roberts, Miss Maclay, and Superintendent Rev. Robert Grierson and Mrs. Grierson. Over 600 visits were made, and the reports were of a most gratifying nature, both as regards the conduct of the children and the treatment given them by foster-parents. Mr. Burges, who had been in charge of the Canadian branch of the work for a number of years, died during the past year, and Rev. Robert Grierson was appointed as Superintendent in his place. The Home authorities state that some of their wards have pushed their way to the front ranks and are occupying prominent positions in the Dominion.

THE CATHOLIC EMIGRATION ASSOCIATION.

During the past year there were received from England at St. George's Home, 1153 Wellington Street, Ottawa, the Canadian Headquarters of The Catholic Emigration Association, 232 boys and 85 girls; total 317. These children came out in nine different parties, and their average age was about fourteen years. Of the boys 111 were placed in the Province of Ontario, 110 in the Province of Quebec, nine with relatives, and two were deported as unsuitable for placement; of the girls 39 were placed in Ontario, 42 in Quebec, and four with relatives. There were 663 applications for children received during the year, 382 for boys and 281 for girls. The health of the children generally has been good, only three deaths having occurred among all the wards of the Association. The Sisters of Charity of St. Paul the Apostle are still in charge of the work, the staff consisting of the Rev. Mother and five Sisters. Mr. Edwin J. Collingwood is the Official Visitor, and there are four clerks engaged regularly in office work. The visits to foster-homes showed that the children were, in most cases, very satisfactorily placed. The Secretary of the Association, Rev. George V. Hudson, of Birmingham, England, and his assistant, Rev. Hubert G. Sandy, visited Canada during the year, and visits were also received from other English people interested in the emigration of children.

MACPHERSON HOME, STRATFORD.

Mr. W. H. Merry, Superintendent of The Miss Annie Macpherson Receiving Home, 51 Avon Street Stratford, Ontario, reports that they received three parties of young people. The first party arrived on June 13th, and consisted of sixty-seven boys and twenty-seven girls, of an average age of thirteen years. The second came in August and numbered 61 boys and 31 girls, their ages averaging twelve years. The third was received in September and was composed of five boys, average age fifteen years. Thus the total for the year was 133 boys and 61 girls. With possibly one or two exceptions, all these children have been provided with foster-homes and are contented and happy. One boy and one girl were returned to England, having proved themselves unworthy of the chance for betterment offered them. There has been practically no illness of any account and no infectious case of any kind. These children are up to the average in intellect and good character and the applications for them continue to come in freely. Quite a number of the young men of the Home are going West and taking up land for themselves. In addition to the regular staff, the Home received assistance in visiting this year from two ministers who take a practical interest in the children.

HAMILTON ENGLISH CHILDREN'S HOME.

The National Children's Home and Orphanage, of London, England, founded by Rev. Dr. Stephenson, sent out to their Receiving Home at Hamilton ninety-four children, ninety-one of these being boys and three girls. The girls were sent for the special purpose of doing domestic service at the Home, but the boys were all placed out in farm situations. These children are visited from the Home at least once a year, and more often if necessary, and the reports of the Visitors show that conditions are satisfactory. Mr. Frank Hills is still in charge of the work here, and conducts it in an efficient manner.

MR. FEGAN'S HOMES.

The Ontario Agency of Mr. Fegan's Homes, which is situated at 295 George Street, Toronto, brought out from England during the past year 104 boys, their ages varying from ten to eighteen years. All of these lads have been placed in farm homes and are reported to be getting along very satisfactorily. Mr. George Greenway, who was absent for a time on account of ill-health, is again in charge of the Home.

NIAGARA-ON-THE-LAKE.

During the past year there were in residence in the Receiving Home of the Church of England Society for Providing Homes for Waifs and Strays upwards of seventy children. Only one party came out from England. This party arrived in June from the Society's Emigration Home at Peckham, London, and numbered seventeen. These were all large girls and were placed out in situations shortly after their arrival. They were accompanied from England by Rev. E. de M. Rudolf, the Honorary Secretary of the work, who remained about three weeks in Canada. A large number of applications were received. Very few of the younger children are sent out from this Home, but are kept there and trained and educated until they are older. A lady visitor is employed all the time visiting the children in their foster-homes, and her report for the past year shows that good progress is being made by the girls.

MRS. BIRT'S HOME, KNOWLTON, QUE.

This Home received from Liverpool eighty-eight boys and seventy-three girls, a total of 161 children. The majority were over ten years of age, though there were a few as young as four years. The Home now has between 1,000 and 1,100 children placed in Canada, and these children are visited regularly. Their conduct in general is reported as being good, the homes comfortable and the children well cared for. In a few instances it has been necessary to remove a child, but this has not occurred often.

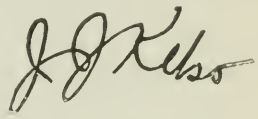
THE SMYLY HOMES, DUBLIN.

There arrived at The Coombe, Hespeler, the Ontario Agency for the Smyly Homes of Dublin, Ireland, thirty boys and girls. The work is in charge of Mr. and Mrs. George W. Tebbs, and is efficiently carried on. These children are placed in foster-homes throughout Ontario and are visited regularly at least once a year and sometimes several times, Mr. and Mrs. Tebbs having made over 100 visits to their wards since last year. A large amount of correspondence has also been carried on, and in almost every case these children are being kindly treated and are happy and contented. A very pleasing feature of the work is that some of the boys and girls who are now

earning for themselves have voluntarily taken up the matter of assisting Miss Smyly to send out more boys and girls, having sent in sufficient to pay for the passage and outfit of two boys. These children are carefully selected, one of the rules of this institution being that a child must be an inmate of one of Miss Smyly's eight Irish Homes at least a year before he or she is sent out to Canada.

SALVATION ARMY AGENCY.

During the past year the Salvation Army has brought out from England and placed in foster-homes in Ontario thirty-eight boys and one girl. These young people were from fourteen to sixteen years of age. The boys were placed in farm situations and are all doing well, while the girl was sent to a relative. Lieut.-Col. Howell is in charge of the Immigration Department of the Army, and the Receiving Home is at 31 Peter Street, Toronto.



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REPORT

ON THE OPERATION OF THE

Liquor License Acts, Ontario

FOR THE YEAR

1909

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1910

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REPORT

ON THE OPERATION OF THE

LIQUOR LICENSE ACTS, ONTARIO

FOR THE YEAR 1909

PROVINCIAL SECRETARY'S OFFICE,

LICENSE BRANCH.

TORONTO, 1st January, 1910.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit the Thirty-fourth Annual Report and accompanying Schedules, respecting the operation of the Liquor License Laws of the Province.

The form of the report has been somewhat improved. The figures given this year are more compactly arranged, and show more clearly the operation of the Act for the License Year.

Owing to the increasing number of Municipalities in which Local Option is being brought into force, and the reduction of licenses authorized by municipal by-laws, the total number of Tavern and Shop Licenses for the License Year, ending the 30th of April, 1909, has been reduced by 112, as compared with the previous year, and for the current License Year 1909-10 up to date there have been issued only 1,863 tavern and 244 shop licenses, which represents a further reduction of 149.

Schedule "A" is a statement of the number of licenses issued in the several counties and cities during the past thirty-four years.

Schedule "B" gives in detail the amounts received for licenses from each city, town, incorporated village and township and unorganized territory of the Province, the number of licenses, extensions and transfers granted, and the amounts divided between the Municipalities and the Province.

The licenses issued during the past four years are as follows:—

Years.	Licenses.								Extensions and transfers of licenses.		
	Tavern.				Shop.	Wholesale.	Club.	Total.			
	Yearly.		Six months.								
	Ordinary.	Beer and wine.	Ordinary.	Beer and wine.					Extensions.	Transfers.	Total.
1905–6.....	2,366	18	51	3	283	24	....	2,745	144	751	895
1906–7.....	2,197	10	47	3	267	23	24	2,571	54	281	335
1907–8.....	2,102	8	43	3	265	25	35	2,481	52	420	472
1908–9.....	2,002	8	48	3	253	23	42	2,379	39	319	358

Municipal Revenue.

The total amount paid to the Municipalities for the year 1909, as shown by this Schedule, was $406,201.12.

Schedule "C."

The fines collected during the past year, as shown by this schedule, amount to $34,330.25, and in the Local Option municipalities, as shown in Schedule "J," the amount collected was $6,940.00.

Schedule "D."

The cost of commissioners and local inspectors for operating and enforcing the Act in the several districts is given in this Schedule.

The provincial inspectors, with the assistance of special officers, have been constantly and energetically employed in enforcing the License Act, and a great improvement in the observance of the law is the result of their efforts.

The expenditure for this service for the ten months to 1st of November, 1909, amounted to $27,492.44.

Commitments for Drunkenness.

Schedule "F" shows the number of Prisoners committed for drunkenness during the years from 1876 to 1909 inclusive. The number committed during the year 1909, as compared with 1908 shows an increase of 237.

The average yearly commitments for each period of five years from 1876 to 1905 inclusive are as follows:

From	1876	to	1880	inclusive 3,812
	1881	to	1885	" 4,016
	1886	to	1890	" 3,311
	1891	to	1895	" 2,703
	1896	to	1900	" 1,920
	1901	to	1905	" 3,186

Respectfully submitted,
W. J. HANNA,
Provincial Secretary.

SCHEDULES.

SCHEDULE A.

COMPARATIVE STATEMENT BY COUNTIES AND CITIES, showing the number of (Provincial) Tavern, Shop, Wholesale and Vessel Licenses issued in the several Counties of the Province, and the Cities separated from Counties, for the license years 1874-5-6-7-8-9-80-1-2-3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses. ***	Vessel licenses.	Remarks.
Algoma (including Kenora, Rainy River, Fort William, Port Arthur, Algoma, Sault Ste. Marie and Manitoulin).	1874	30	14	.....	3	
	1875	36	15	.....	3	
	1876	18	6			
	1877	19	5			
	1878	19	5			
	1879	21	8	1		
	1880	22	6	1		
	1881	29	9	1		
	1882	35	9	1		
	1883	56	6	1		
	1884	74	12	2		
	1885	58	12	1		
	1886	62	16	1		
	1887	78	11	2		
	1888	83	16	1		
	1889	90	17			
	1890	94	15			
	1891	94	11			
	1892	92	11			
	1893	95	13			
	1894	93	12			
	1895	96	13	1		
	1896	99	13			
	1897	108	15			
	1898	111	14	.....	Club Licenses	
	1899	120	14			
	1900	118	13			
	1901	116	14	1		
	1902	131	15	1		
	1903	130	15	1		
	1904	140	16	1		
	1905	130	13			
	1906	123	11	.....	1	
	1907	120	11	.....	2	
	†1908	130	12	.....	3	

*** For Wholesale Licenses after 1905 see Schedule of Wholesale Licenses.

† Apparent increase is caused by re-arrangement of districts, decrease of same number in Nipissing.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brant (not including City of Brantford).	1874	95	29			
	1875	73	22	2		
	1876	56	14	4		
	1877	.....	.....	7	.....	Dunkin Act in force.
	1878	53	11	5		
	1879	55	14	1		
	1880	57	14	1		
	1881	55	14	1		
	1882	59	13	1		
	1883	58	11	1		
	1884	49	7			
	1885	44	7	1		
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	26	2			
	1890	26	2			
	1891	22	2			
	1892	23	2			
	1893	23	1			
	1894	22	1			
	1895	18	1			
	1896	18	1			
	1897	18	1			
	1898	18	1			
	1899	18	1			
	1900	17	1			
	1901	18	1			
	1902	18	1			
	1903	17	1			
	1904	17	1			
	1905	18	1			
	1906	18	1			
	1907	16	1			
	1908	16	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Bruce.....	1874	180	25			
	1875	119	22			
	1876	88	13	3		
	1877	83	12	2		
	1878	83	9	2	.....	Dunkin Act in force for 10 months.
	1879	93	12			
	1880	98	14			
	1881	105	15			
	1882	109	18			
	1883	108	16			
	1884	99	15			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	97	6			
	1889	102	6			
	1890	98	6			
	1891	97	6			
	1892	96	5			
	1893	97	5			
	1894	90	5			
	1895	90	5			
	1896	88	4			
	1897	87	4			
	1898	83	4			
	1899	81	4			
	1900	82	4			
	1901	81	4			
	1902	80	4			
	1903	80	4	1		
	1904	77	3	1		
	1905	74	3			
	1906	62	2			
	1907	55	2			
	1908	55	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Carleton (not including Ottawa).	1874	89	5			
	1875	79	8			
	1876	44	1	2		
	1877	55	3			
	1878	43	3			
	1879	43	1			
	1880	42	3			
	1881	50	3			
	1882	54	1			
	1883	58				
	1884	58	1			
	1885	55				
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	44	1			
	1890	44	1			
	1891	45				
	1892	46				
	1893	44				
	1894	45				
	1895	45				
	1896	44				
	1897	44				
	1898	46				
	1899	44				
	1900	44				
	1901	43				
	1902	43				
	1903	42				
	1904	42				
	1905	36				
	1906	27				
	1907	25				
	1908	12				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Dufferin.....	1881	33	7	.....	.....	New County, erected 24th January, 1881.
	1882	33	5			
	1883	34	5			
	1884	34	4			
	1885	.....	.....	.....	.....	C.T.A. in force.
	1886	.....	.... .	....	.....	" "
	1887	.....	... .	....	.....	" "
	1888	24	2			
	1889	27	2			
	1890	26	2			
	1891	24	2			
	1892	24	2			
	1893	21	2			
	1894	21	2			
	1895	19	2			
	1896	19	2			
	1897	18	2			
	1898	15	2			
	1899	18	1			
	1900	18	1			
	1901	18	1			
	1902	17	1			
	1903	17	1			
	1904	17	1			
	1905	17	1			
	1906	15	1			
	1907	13	1			
	1908	12	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Elgin	1874	113	25			
	1875	110	24			
	1876	66	16			
	1877	66	10			
	1878	69	12			
	1879	72	16			
	1880	74	12			
	1881	74	13			
	1882	74	13			
	1883	74	16			
	1884	74	12			
	1885	71	10			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
Not including St. Thomas	1889	48	2			
" "	1890	44	1			
" "	1891	43	1			
" "	1892	44	1			
" "	1893	42	1			
" "	1894	41	1			
" "	1895	41	1			
" "	1896	39	1			
" "	1897	36	1			
" "	1898	35	1			
" "	1899	36	1			
" "	1900	36	1			
" "	1901	35	1			
" "	1902	36				
" "	1903	36				
" "	1904	36				
" "	1905	29				
" "	1906	23				
" "	1907	23				
" "	1908	23				

SCHEDULE A.—Comparative statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Essex	1874	120	28	6		
	1875	101	25	6		
	1876	62	14	5	1	
	1877	69	18	1	1	
	1878	69	18	2	1	
	1879	71	18	3	1	
	1880	70	19	2	1	
	1881	74	21	2		
	1882	71	20	2		
	1883	74	19	2		
	1884	70	15	1		
	1885	77	13			
	1886	74	16			
	1887	84	15			
	1888	82	10			
	1889	95	12			
	1890	94	8			
Not including Windsor.....	1891	68	5			
" "	1892	71	5			
" "	1893	73	5			
" "	1894	70	6			
" "	1895	75	6			
" "	1896	72	6			
" "	1897	73	6			
" "	1898	72	6			
" "	1899	76	5	1		
" "	1900	83	5	1		
" "	1901	81	6	1		
" "	1902	84	6	1		
" "	1903	84	7	1		
" "	1904	84	8	1		
" " ...	1905	84	6			
" "	1906	80	6			
" "	1907	80	6			
" "	1908	76	7			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Frontenac (not including Kingston).	1874	71	2			
	1875	57	29			
	1876	29	....	4		
	1877	17	.....	.....	.....	Dunkin Act assumed to be in force until quashed December 28.
	1878	34				
	1879	36				
	1880	33	1			
	1881	33	1			
	1882	33	2			
	1883	36	2			
	1884	34	2			
	1885	34	1			
	1886	.....	.....	.....	....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	23				
	1890	25				
	1891	23				
	1892	24				
	1893	22				
	1894	22				
	1895	24				
	1896	21				
	1897	33				
	1898	21				
	1899	22				
	1900	23				
	1901	23				
	1902	22				
	1903	22				
	1904	21				
	1905	21				
	1906	13				
	1907	10				
	1908	7				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Grey	1874	115	20	.....	3	
	1875	114	16	.....	2	
	1876	77	11	5	2	
	1877	.....	.....	6	2	Dunkin Act in force
	1878	72	7	4	1	Dunkin Act in force until September.
	1879	91	12	1	1	Melancthon and Shelburne attached to new County of Dufferin.
	1880	88	17	1	2	
	1881	84	16	.....	1	
	1882	88	18	.....	1	
	1883	95	20	.....	3	
	1884	91	19	.....	1	
	1885	92	18			
	1886	92	16	.....	3	
	1887	86	14	.....	3	
	1888	84	7	.....	4	
	1889	84	6	.....	1	
	1890	81	6			
	1891	75	5			
	1892	76	5			
	1893	77	5			
	1894	76	5			
	1895	76	5			
	1896	73	5			
	1897	72	3			
	1898	69	2			
	1899	66	2			
	1900	68	3			
	1901	68	2			
	1902	68	2			
	1903	67	2			
	1904	65	2			
	1905	62	2			
	1906	35				
	1907	31				
	1908	27				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Haldimand	1874	96	16			
	1875	83	13			
	1876	45	5			
	1877	49	4			
	1878	49	4			
	1879	50	5			
	1880	47	5			
	1881	51	5			
	1882	52	5			
	1883	51	5			
	1884	47	5			
	1885	47	3			
	1886	48	4			
	1887	49	4			
	1888	43	4			
	1889	45	3			
	1890	49	3			
	1891	47	3			
	1892	47	3			
	1893	44	3			
	1894	42	3			
	1895	42	3			
	1896	42	4			
	1897	37	4			
	1898	36	4			
	1899	35	4			
	1900	35	4			
	1901	33	4			
	1902	32	4			
	1903	32	3			
	1904	32	3			
	1905	31	3			
	1906	30	3			
	1907	28	3			
	1908	27	2			
Haliburton	1886	7				
	1887	6				
	1888	6				
	1889	7				
	1890	7				
	1891	8				
	1892	8				
	1893	8				
	1894	10				
	1895	8				
	1896	8				
	1897	7				
	1898	6				
	1899	6				
	1900	7				
	1901	7				
	1902	7				
	1903	7				
	1904	7				
	1905	6				
	1906	6				
	1907	6				
	1908	6				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Halton	1874	61	4			
	1875	58	5			
	1876	39	2	1		
	1877	38	1			
	1878	38	1			
	1879	42	1			
	1880	41	1			
	1881	41	1			
	1882	.....	.....	.....	.....	C.T.A. in force.
	1883	.....	.....	.....	.....	" "
	1884	.....	.....	.....	.....	" "
	1885	.....	.....	.....	.....	" "
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	28				
	1889	28				
	1890	27				
	1891	27				
	1892	26				
	1893	27				
	1894	28				
	1895	28				
	1896	26				
	1897	23				
	1898	22				
	1899	22				
	1900	23				
	1901	21				
	1902	22				
	1903	20				
	1904	20				
	1905	19				
	1906	15				
	1907	17				
	1908	17				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses	Vessel licenses.	Remarks.
Hastings	1874	117	23	1		
	1875	100	21	2		
	1876	76	11	3	1	
	1877	82	14	3	1	
	1878	89	15	3	2	
	1879	94	15	3	1	
	1880	91	16	3		
	1881	90	15	3		
	1882	95	13	3		
	1883	97	15	3		
	1884	90	14	3		
	1885	98	17	3		
	1886	104	16	2		
	1887	102	13	2		
	1888	96	13	3		
Not including Belleville	1889	73	9			
" "	1890	74	8			
" "	1891	74	8			
" "	1892	72	7			
" "	1893	70	7			
" "	1894	67	7			
" "	1895	68	8			
" "	1896	66	6			
" "	1897	67	7			
" "	1898	59	7			
" "	1899	57	8			
" "	1900	55	8			
" "	1901	56	9			
" "	1902	56	9			
" "	1903	55	9			
" "	1904	53	8			
" "	1905	49	7			
" "	1906	49	7			
" "	1907	46	7			
" " .. .	1908	43	5			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Huron.....	1874	150	38			
	1875	164	37	2		
	1876	113	16	3		
	1877	124	16			
	1878	127	20			
	1879	134	21			
	1880	131	16			
	1881	128	15			
	1882	124	15			
	1883	124	15			
	1884	111	14			
	1885	.....	.....	.....	....	C.T.A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	108	11			
	1889	109	8			
	1890	103	5			
	1891	104	5			
	1892	102	5	1		
	1893	94	5	1		
	1894	92	5	1		
	1895	90	5	1		
	1896	88	6			
	1897	85	6			
	1898	83	6			
	1899	84	6			
	1900	82	6			
	1901	80	6			
	1902	79	6			
	1903	77	6			
	1904	76	5			
	1905	73	5			
	1906	72	5			
	1907	64	4			
	1908	62	4			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kent.....	1874	128	41	.....	1	
	1875	118	34	.....	1	
	1876	66	13	4	1	
	1877	67	15	.....	1	
	1878	65	13			
	1879	67	14			
	1880	67	13			
	1881	69	13	.....	1	
	1882	69	14	.....	1	
	1883	70	14			
	1884	75	11			
	1885	71	8			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	72	6			
	1890	75	6			
	1891	63	5			
	1892	61	4			
	1893	61	4			
	1894	61	4			
Not including Chatham	1895	44	2			
" "	1896	46	2			
" "	1897	43	3			
" "	1898	42	3			
" "	1899	42	3			
" " ...	1900	41	3			
" "	1901	41	3			
" "	1902	43	3			
" "	1903	41	3			
" "	1904	28	3			
" "	1905	27	3			
" "	1906	28	3			
" "	1907	29	3			
" "	1908	31	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lambton	1874	89	44	1		
	1875	85	33			
	1876	65	28	1		
	1877	65	25			
	1878	70	27			
	1879	72	26			
	1880	71	25			
	1881	72	22			
	1882	75	22			
	1883	73	19			
	1884	74	16	1		
	1885	70	10	1		
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	65	9			
	1890	70	10			
	1891	64	6			
	1892	62	5			
	1893	64	5			
	1894	63	5			
	1895	61	5			
	1896	62	5			
	1897	62	4			
	1898	58	4			
	1899	58	4			
	1900	58	4			
	1901	59	4			
	1902	60	4			
	1903	61	4			
	1904	60	4			
	1905	58	3			
	1906	43	3			
	1907	42	3			
	1908	41	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lanark.....	1874	62	20	2		
	1875	62	20	1		
	1876	32	9	2		
	1877	32	9			
	1878	7	4	.....	.....	Dunkin Act in force, except in Perth.
	1879	33	6			
	1880	34	8			
	1881	36	6			
	1882	36	7			
	1883	35	7			
	1884	36	7			
	1885	37	6			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	39	6			
	1890	45	7			
	1891	44	6			
	1892	44	7			
	1893	44	7			
	1894	44	6			
	1895	44	6			
	1896	44	6			
	1897	43	6			
	1898	43	6			
	1899	43	6			
	1900	44	6			
	1901	44	6			
	1902	45	6			
	1903	43	6			
	1904	42	6			
	1905	40	6			
	1906	37	3			
	1907	35	3			
	1908	35	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Leeds and Grenville.....	1874	145	32	1		
	1875	136	23	1		
	1876	79	23	3		
	1877	101	25			
	1878	97	19			
	1879	97	18			
	1880	97	20	1		
	1881	89	18			
	1882	92	21			
	1883	94	21			
	1884	88	17			
	1885	77	17			
	1886	.....	.....	....	.....	C.T.A. in force.
	1887	....	.....	.....	.....	" "
	1888	.....	.....	..... .	.....	" "
	1889	73	13			
	1890	70	10			
	1891	69	10			
	1892	66	8			
	1893	67	7			
	1894	64	7			
	1895	65	7			
	1896	61	7			
	1897	57	7			
	1898	57	7	1		
	1899	58	8			
	1900	56	8			
	1901	58	8	.....	Clubs	
	1902	55	8			
	1903	57	8			
	1904	56	8			
	1905	36	6			
	1906	48	8	.....	1	
	1907	46	6	.....	1	
	1908	47	4	.....	2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lennox and Addington	1874	52	7	.....	1	
	1875	46	8			
	1876	28	6	1		
	1877	.. ..	.....	1	.....	Dunkin Act in force.
	1878	36	6			
	1879	37	5			
	1880	37	5			
	1881	41	5			
	1882	43	6			
	1883	45	6			
	1884	44	5			
	1885	42	5			
	1886	.....	.... ..	.....	.....	C.T.A. in force.
	1887	.....	..... .	.....	....	" "
	1888	.....	.....	.....	.....	" "
	1889	52	3			
	1890	49	2			
	1891	46	2			
	1892	47	2			
	1893	47	2			
	1894	44	1			
	1895	40	1			
	1896	37	1			
	1897	39	1			
	1898	37	1			
	1899	36	1			
	1900	35	1			
	1901	31	2			
	1902	34	2			
	1903	34	2			
	1904	34	2			
	1905	33	2			
	1906	33	2			
	1907	31	2			
	1908	31	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lincoln (not including St. Catharines).	1874	94	23			
	1875	103	37			
	1876	70	31			
	1877	70	25			
	1878	69	21			
	1879	72	16			
	1880	73	12			
	1881	69	14			
	1882	73	15			
	1883	72	13			
	1884	71	11			
	1885	64	10			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	36	3			
	1890	36	3			
	1891	35	3			
	1892	34	1			
	1893	29	1			
	1894	28	1			
	1895	28	1			
	1896	27	1			
	1897	27	1			
	1898	27	1			
	1899	26	1			
	1900	26	1			
	1901	26	1			
	1902	26	1			
	1903	25	1			
	1904	21	1			
	1905	21	1			
	1906	13	1			
	1907	11	1			
	1908	11	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Middlesex (not including London).	1874	188	17	1		
	1875	174	33			
	1876	122	26	3		
	1877	139	23			
	1878	143	21			
	1879	141	19			
	1880	134	18			
	1881	138	18			
	1882	133	16			
	1883	130	18			
	1884	126	17			
	1885	128	16	.....	1	
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	82	8			
	1890	93	6			
	1891	93	5			
	1892	90	5			
	1893	80	4			
	1894	73	4			
	1895	69	4			
	1896	68	4			
	1897	67	4			
	1898	65	4			
	1899	67	4			
	1900	68	4			
	1901	67	4			
	1902	66	4			
	1903	63	2			
	1904	60	2			
	1905	56	1			
	1906	55				
	1907	49				
	1908	50				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Muskoka and Parry Sound..	1874	9				
	1875	23				
	1876	19				
	1877	22				
	1878	29				
	1879	38	1			
	1880	44	4			
	1881	45	4			
	1882	48	5			
	1883	49	6			
	1884	48	4			
	1885	37	1			
	1886	23				
	1887	21				
	1888	32	1			
	1889	45	2			
	1890	47	1			
	1891	47	1			
	1892	53	1			
	1893	50	2			
	1894	56	2			
	1895	60	1			
	1896	60	1			
	1897	59	1			
	1898	58	1			
	1899	57	1			
	1900	59	1			
	1901	56	1			
	1902	58	1			
	1903	55	1			
	1904	52	1			
	1905	53	2			
	1906	53	2			
	1907	50	2			
	1908	45	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Nipissing (including Temiscaming).	1878	2	1			
	1879	3	1			
	1880	3	1			
	1881	11	8			
	1882	8	5			
	1883	9	5			
	1884	5	5			
	1885	23	6			
	1886	22	4			
	1887	24	5			
	1888	23	4			
	1889	23	4			
	1890	27	4			
	1891	26	5			
	1892	30	6			
	1893	30	6			
	1894	28	5			
	1895	31	6			
	1896	34	6			
	1897	36	6			
	1898	34	5			
	1899	32	5			
	1900	34	5			
	1901	37	5			
	1902	39	5	Clubs.		
	1903	40	7			
	1904	43	8			
	1905	46	9			
	1906	56	8			
	1907	54	9			
	*1908	42	8	2		

* Apparent decrease is caused by re-arrangement of districts; increase of same number in Algoma.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Norfolk	1874	73	6			
	1875	74	6			
	1876	51	4	2		
	1877	51	5	1		
	1878	55	5			
	1879	51	7			
	1880	51	6			
	1881	55	6			
	1882	56	6			
	1883	54	6			
	1884	51	4			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	37	4			
	1889	41	3			
	1890	39	2			
	1891	39	2			
	1892	41	2			
	1893	39	2			
	1894	35	2			
	1895	37	2			
	1896	31	2			
	1897	33	2			
	1898	32	2			
	1899	30	2			
	1900	29	2			
	1901	29	2			
	1902	29	2			
	1903	30	2			
	1904	29	2			
	1905	25	2			
	1906	22	2			
	1907	16	2			
	1908	17	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Northumberland & Durham.	1874	135	35	2	1	
	1875	121	32	2	1	
	1876	102	27	4	1	
	1877	103	25	2	1	
	1878	89	21	2	2	Dunkin Act in force for ten months except in Port Hope and, Cobourg.
	1879	98	21	.....	1	
	1880	100	22	.....	1	
	1881	100	23	.....	1	
	1882	102	23	.....	1	
	1883	104	23	.....	1	
	1884	101	19			
	1885	97	16			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	81	14			
	1890	74	13			
	1891	77	15			
	1892	76	14			
	1893	75	10			
	1894	68	9			
	1895	66	8			
	1896	64	9			
	1897	61	7			
	1898	59	7			
	1899	57	7			
	1900	55	7			
	1901	56	7			
	1902	56	7			
	1903	55	7			
	1904	53	7			
	1905	50	7			
	1906	48	6			
	1907	44	5			
	1908	26	4			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ontario	1874	86	35			
	1875	87	23			
	1876	60	10			
	1877	58	9			
	1878	55	8	2	.....	Dunkin Act in force for ten months.
	1879	61	9			
	1880	65	11			
	1881	66	12			
	1882	71	13			
	1883	72	12			
	1884	68	11			
	1885	67	12			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	64	7			
	1890	62	7			
	1891	60	4			
	1892	57	6			
	1893	50	5			
	1894	47	4			
	1895	45	4			
	1896	44	4			
	1897	50	4			
	1898	49	4			
	1899	45	4			
	1900	46	4			
	1901	46	4			
	1902	46	4			
	1903	44	4			
	1904	41	3			
	1905	42	3			
	1906	32	3			
	1907	31	3			
	1908	30	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Oxford	1874	104	39			
	1875	102	25			
	1876	73	9	4		
	1877	70	10	1		
	1878	71	10			
	1879	74	12			
	1880	74	14			
	1881	73	13			
	1882	74	11			
	1883	72	9			
	1884	62	8			
	1885	.....	.....	.....	.....	C.T.A. in force
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	"
	1888	.....	.....	.....	.....	" "
	1889	52	6	1		
	1890	58	7	1		
	1891	57	5	1		
	1892	50	5			
	1893	50	6			
	1894	48	6			
	1895	48	5			
	1896	47	5			
	1897	47	5			
	1898	47	5			
	1899	47	5			
	1900	47	5			
	1901	47	5			
	1902	45	5			
Not including Woodstock	1903	33	3			
" " "	1904	31	3			
" " "	1905	28	3			
" " "	1906	24	3			
" " "	1907	22	2			
" " "	1908	19	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peel	1874	91	15			
	1875	86	15			
	1876	49	10			
	1877	57	9			
	1878	60	8			
	1879	57	7			
	1880	62	7			
	1881	56	7			
	1882	57	6			
	1883	57	5			
	1884	55	4			
	1885	58	4			
	1886	55	5			
	1887	56	4			
	1888	57	3			
	1889	52	3			
	1890	52	3			
	1891	51	3			
	1892	47	3			
	1893	48	2			
	1894	47	2			
	1895	46	2			
	1896	47	2			
	1897	47	2			
	1898	42	2			
	1899	40	2			
	1900	42	2			
	1901	40	2			
	1902	39	2			
	1903	39	1			
	1904	41	1			
	1905	25				
	1906	24				
	1907	20				
	1908	20				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Perth	1874	145	23			
	1875	135	25			
	1876	101	13	3		
	1877	105	17			
	1878	105	17			
	1879	110	18			
	1880	110	19			
	1881	106	19			
	1882	110	19			
	1883	109	17			
	1884	102	14			
	1885	93	14			
	1886	95	12			
	1887	95	13			
	1888	96	10			
Not including Stratford	1889	74	5			
" "	1890	72	5			
" "	1891	69	4			
" "	1892	68	5			
" "	1893	65	6			
" "	1894	62	5			
" "	1895	61	5			
" "	1896	58	5			
" "	1897	59	5			
" "	1898	57	5			
" "	1899	55	5			
" "	1900	53	6			
" "	1901	53	6			
" "	1902	54	6			
" "	1903	53	6			
" "	1904	48	6			
" "	1905	48	6			
" "	1906	40	6			
" "	1907	44	6			
" "	1908	46	6			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peterborough	1874	98	16			
	1875	72	16			
	1876	40	11	2	1	
	1877	43	11		1	
	1878	35	11		1	Dunkin Act in force in part of West Riding for 10 months.
	1879	42	13		1	
	1880	46	12		1	
	1881	46	14		1	
	1882	50	15		1	
	1883	50	14		1	
	1884	46	13		1	
	1885	43	12			
	1886					C.T.A. in force.
	1887					" "
	1888					" "
	1889	43	10		1	" "
	1890	41	11			
	1891	45	9			
	1892	46	8			
	1893	43				
	1894	39				
	1895	47	6			
	1896	47	6			
	1897	43	6			
	1898	40	6			
	1899	38	6	1		
	1900	38	5	1		
	1901	38	5	1		
	1902	37	5	1		
	1903	37	6	1		
	1904	37	6	1		
	1905	33	5	1		
	1906	27	4			
Not including City of Peterborough	1907	6				
" " "	1908	5				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prescott and Russell.....	1874	63	10	1		
	1875	58	11			
	1876	52				
	1877	46	5			
	1878	49	5			
	1879	41	5			
	1880	42	4			
	1881	50	5			
	1882	53	6			
	1883	62	7			
	1884	65	4			
	1885	65	3			
	1886	68	1			
	1887	78	1			
	1888	76	1			
	1889	76	1			
	1890	78	2			
	1891	75	3			
	1892	77	2			
	1893	72	2			
	1894	69	3			
	1895	71	3			
	1896	76	3			
	1897	76	4			
	1898	72	4			
	1899	74	4			
	1900	76	4			
	1901	77	5			
	1902	78	5			
	1903	77	5			
	1904	75	5			
	1905	76	4			
	1906	77	4			
	1907	69	4			
	1908	71	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prince Edward	1874	22	3	.....	3	
	1875	33	3	.....	1	
	1876	.....	.....	1	1	Dunkin Act in force.
	1877	.....	.....	.....	.....	" "
	1878	.....	.....	.....	.....	" "
	1879	23	2	.....	1	
	1880	24	2	.....	3	
	1881	24	3	.....	1	
	1882	22	3	.....	2	
	1883	23	4	.....	2	
	1884	21	1	.....	2	
	1885	23	2	.....	2	
	1886	24	2			
	1887	21	2	.....	2	
	1888	18	2			
	1889	16	2			
	1890	18	2			
	1891	18	2			
	1892	17	2			
	1893	16	2			
	1894	15	2			
	1895	15	2			
	1896	14	2			
	1897	13	2			
	1898	13	2			
	1899	12	2			
	1900	12	2			
	1901	12	2			
	1902	12	2			
	1903	13	1			
	1904	12	1			
	1905	11	1			
	1906	9	1			
	1907	9	1			
	1908	9	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Renfrew	1874	100	35	.....	1	
	1875	102	30	1	1	
	1876	51	20	.....	1	
	1877	42	17			
	1878	31	15			
	1879	36	16			
	1880	42	21			
	1881	47	17			
	1882	48	23			
	1883	63	30			
	1884	44	20	.....	.....	C.T.A. in force.
	1885	.....	.....	.....	.....	" "
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	
	1888	55	12			
	1889	55	16			
	1890	56	16			
	1891	55	13			
	1892	58	14			
	1893	60	13			
	1894	66	15			
	1895	65	17			
	1896	63	16			
	1897	62	14			
	1898	58	14			
	1899	60	14			
	1900	60	14			
	1901	60	14			
	1902	59	15			
	1903	59	10			
	1904	58	10			
	1905	56	10			
	1906	57	9			
	1907	56	9			
	1908	52	9			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Simcoe	1874	223	42			
	1875	196	35	2	2	
	1876	135	24	2	2	
	1877	137	24	1	2	
	1878	149	21	1	1	
	1879	142	20	1	1	
	1880	155	23	1	1	
	1881	144	23	1	1	Mono and Mulmur attached to new County of Dufferin.
	1882	146	23			
	1883	147	26			
	1884	138	24			
	1885	...	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	121	17			
	1889	134	18			
	1890	123	17			
	1891	113	15			
	1892	117	12			
	1893	113	11			
	1894	106	11			
	1895	105	11			
	1896	102	10			
	1897	100	9			
	1898	97	9			
	1899	95	9			
	1900	97	8			
	1901	96	8			
	1902	95	8			
	1903	90	8			
	1904	88	8			
	1905	84	8			
	1906	81	7			
	1907	69	6			
	1908	54	6			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Stormont, Dundas and Glengarry.	1874	122	31			
	1875	80	28			
	1876	82	22			
	1877	87	17			
	1878	94	17			
	1879	91	16			
	1880	91	18			
	1881	96	18			
	1882	95	18			
	1883	89	17			
	1884	92	15			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	105	8			
	1889	111	10			
	1890	103	8			
	1891	96	10			
	1892	94	10			
	1893	84	8			
	1894	82	8	1		
	1895	80	4			
	1896	79	4			
	1897	78	4			
	1898	74	3	1		
	1899	75	3			
	1900	73	2			
	1901	74	2			
	1902	73	2			
	1903	71	2			
	1904	72	3			
	1905	64	4			
	1906	54	2			
	1907	54	2			
	1908	53	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Victoria	1874	78	13	1		
	1875	70	9		1	
	1876	55	5	1		Including Haliburton.
	1877	56	5			
	1878	56	6			
	1879	60	6			
	1880	59	5			
	1881	62	4			
	1882	62	3		1	
	1883	62	3		2	
	1884	58	3			
	1885	54	3			
	1886					C.T.A. in force.
	1887					" "
	1888					" "
	1889	46	2			
	1890	44	2			
	1891	47	2			
	1892	40	3			
	1893	39	3			
	1894	38	3			
	1895	33	2			
	1896	33	2			
	1897	33	1			
	1898	32	1			
	1899	29	1			
	1900	29	1			
	1901	30	1			
	1902	30	1			
	1903	26	1			
	1904	25	1			
	1905	26	1			
	1906	25	1			
	1907	24	1			
	1908	15	1			

SCHEDULE A.—Comparative Statement etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Waterloo.....	1874	136	21			
	1875	136	20	3		
	1876	86	19	13		
	1877	84	17	10		
	1878	87	17			
	1879	89	15			
	1880	87	15			
	1881	88	16			
	1882	90	17			
	1883	91	15	.....	1	
	1884	92	14			
	1885	90	13			
	1886	87	12			
	1887	87	12			
	1888	90	9	1		
	1889	91	10	1		
	1890	92	10	1		
	1891	91	10	1		
	1892	90	11	1		
	1893	90	10	1		
	1894	88	10	1		
	1895	89	10	3		
	1896	90	10	5		
	1897	88	10	3		
	1898	86	10	2		
	1899	85	11	2		
	1900	86	10	2		
	1901	85	10	2		
	1902	85	8	1		
	1903	81	8	1		
	1904	80	10	1		
	1905	78	10		Clubs.	
	1906	78	10			
	1907	76	10			
	1908	76	10	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Welland.....	1874	145	28	3		
	1875	151	23			
	1876	73	19			
	1877	80	19			
	1878	89	21			
	1879	92	25			
	1880	87	29			
	1881	81	19			
	1882	78	20			
	1883	79	18			
	1884	82	14			
	1885	79	15			
	1886	82	12			
	1887	78	10			
	1888	70	8			
	1889	73	9			
	1890	73	9			
	1891	70	9			
	1892	71	9			
	1893	66	10			
	1894	64	10			
	1895	66	10			
	1896	65	9			
	1897	63	9			
	1898	62	9			
	1899	60	9			
	1900	64	9			
	1901	65	10			
	1902	64	10			
	1903	61	10			
	1904	61	10			
	1905	59	10			
	1906	64	10			
	1907	65	10			
	1908	64	10			

SCHEDULE A.—Comparative Statement, etc,—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wellington	1874	183	52			
	1875	182	41	3		
	1876	138	29	3		
	1877	130	28	3		
	1878	134	29			
	1879	138	29			
	1880	145	30			
	1881	134	24			Orangeville, Amaranth and East Garafraxa attached to new County of Dufferin.
	1882	128	26			
	1883	126	22			
	1884	116	19			
	1885	104	13			
	1886					C.T.A. in force.
	1887					" "
	1888					" "
Not including Guelph	1889	78	5			
" "	1890	77	4			
" "	1891	80	3			
" "	1892	79	9			
" "	1893	76	2			
" "	1894	72	2			
" "	1895	71	1			
" "	1896	71	1			
" "	1897	68	1			
" "	1898	64	1			
" "	1899	63	1			
" "	1900	62	1			
" "	1901	62	1			
" "	1902	61	1			
" "	1903	58	1			
" "	1904	57				
" "	1905	49				
" "	1906	44				
" "	1907	42				
" "	1908	39				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wentworth (not including Hamilton).	1874	110	32	4		
	1875	107	19	2		
	1876	61	11	2		
	1877	56	10			
	1878	47	6			
	1879	63	6			
	1880	56	6			
	1881	55	6			
	1882	51	6			
	1883	52	6			
	1884	54	6			
	1885	54	6			
	1886	49	6			
	1887	51	5			
	1888	47	4			
	1889	49	3			
	1890	49	4			
	1891	49	3			
	1892	46	3			
	1893	45	3			
	1894	42	3			
	1895	41	3			
	1896	38	3			
	1897	38	3			
	1898	39	3			
	1899	39	3			
	1900	39	3			
	1901	39	3			
	1902	37	3		Clubs.	
	1903	34	3			
	1904	34	3			
	1905	35	1			
	1906	33	1		1	
	1907	30	1		2	
	1908	22	1		2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
York (not including Toronto).	1874	148	39			
	1875	164	35			
	1876	108	16	1		
	1877	97	15			
	1878	.....	.....	.....	.....	Dunkin Act in force.
	1879	114	15	.....	.....	Dunkin Act in force one month, May.
	1880	117	16			
	1881	128	21			
	1882	131	24			
	1883	132	23			
	1884	121	13			
	1885	114	12			
	1886	116	10			
	1887	109	7			
	1888	107	2			
	1889	112	1			
	1890	108	2			
	1891	105	3			
	1892	108	4			
	1893	104	4			
	1894	103	4			
	1895	102	4			
	1896	100	4			
	1897	100	4			
	1898	98	4			
	1899	97	2			
	1900	92	2			
	1901	92	2	1		
	1902	92	2	1		
	1903	91	2	1		
	1904	84	1	1		
	1905	73	1		Clubs.	
	1906	54	1			
	1907	50	1		2	
	1908	51	1		4	

SCHEDULE A.—Comparative Statement, etc:—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Toronto	1874	309	184	21	16	
	1875	299	128	28	9	
	1876	216	100	39	9	
	1877	182	100	26	6	
	1878	181	92	20	10	
	1879	195	88	19	6	
	1880	204	94	18	4	
	1881	210	95	15	6	
	1882	216	100	14	7	
	1883	197	98	14	5	
	1884	217	88	13	3	
	1885	227	71	*14	2	
	1886	224	66	13	3	
	1887	150	50	13	1	
	1888	150	50	12	3	
	1889	152	50	14	3	
	1890	150	50	11		
	1891	150	50	11		
	1892	150	50	10		
	1893	149	50	10		
	1894	150	50	11		
	1895	150	50	8		
	1896	150	50	9		
	1897	150	50	6		
	1898	150	50	6		
	1899	150	50	6		
	1900	150	50	5		
	1901	150	50	7		
	1902	150	50	5		
	1903	150	50	6		
	1904	150	50	8	Clubs.	
	1905	147	50	11		
	1906	146	50		12	
	1907	144	50		15	
	1908	144	50		14	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Hamilton.....	1874	127	93	....	3	
	1875	110	72			
	1876	68	61	11	1	
	1877	68	55	7	2	
	1878	68	64	7	2	
	1879	68	61	8		
	1880	74	57	7		
	1881	89	55	7		
	1882	98	58	8		
	1883	105	54	8		
	1884	97	47	4		
	1885	110	48	3		
	1886	112	45	5		
	1887	107	40	4		
	1888	111	37	2		
	1889	91	38	3		
	1890	92	38	3		
	1891	91	37	3		
	1892	94	34	3		
	1893	94	30	3		
	1894	75	20	4		
	1895	75	20	4		
	1896	76	20	4		
	1897	75	20	3		
	1898	75	20	2		
	1899	75	20	2	Clubs.	
	1900	75	19	3		
	1901	75	19	3		
	1902	75	19	3		
	1903	75	19	3		
	1904	73	18	3		
	1905	68	17	5		
	1906	68	17		2	
	1907	68	17		3	
	1908	69	17		3	

*Dominion issues.

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ottawa	1874	120	77	6		
	1875	114	148	6		
	1876	75	77	7	1	
	1877	75	80	2	1	
	1878	73	77	.....	1	
	1879	73	71	.....	1	
	1880	75	72	.....	1	
	1881	75	77	.....	1	
	1882	75	76	.....	1	
	1883	75	84	.....	1	
	1884	75	78	....	1	
	1885	75	77			
	1886	75	69	1		
	1887	75	68	1	1 B. & W.	
	1888	76	54	2	1	
	1889	80	56	1	1 B. & W	
	1890	88	59	2		
	1891	87	59	1		
	1892	78	46	1		
	1893	72	40	5		
	1894	71	38	5		
	1895	70	33	3		
	1896	76	33	4		
	1897	77	33	5		
	1898	80	33	6		
	1899	78	32	7		
	1900	75	32	9		
	1901	76	32	8		
	1902	76	32	7		
	1903	77	31	6	Clubs.	
	1904	67	31	5		
	1905	67	31	5		
	1906	67	31	.. ..	3	
	1907	65	31	.....	3	
	1908	65	26	....	3	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
London...	1874	75	40	3		
	1875	75	74	2		
	1876	57	34	5		
	1877	58	35	1		
	1878	58	37	1		
	1879	57	36	2		
	1880	45	27	2		
	1881	45	24	2		
	1882	47	26	3		
	1883	47	24	2		
	1884	48	22	2		
	1885	49	23	1		
	1886	61	21	2		
	1887	54	19	2		
	1888	57	14	1		
	1889	58	13	1		
	1890	56	12	1		
	1891	41	10	1		
	1892	34	6	3		
	1893	34	6	5		
	1894	34	6	2		
	1895	35	6	2		
	1896	34	6	2		
	1897	34	6	2		
	1898	34	6	2		
	1899	34	6	2	Clubs.	
	1900	35	6	2		
	1901	35	6	2		
	1902	35	6	2		
	1903	35	6	*1		
	1904	35	6	*1		
	1905	32	5	1		
	1906	26	5	.....	1	
	1907	26	5	.. ..	2	
	1908	26	5	.....	2	

*6 months.

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kingston	1874	97	25	.....	1	
	1875	75	20	3	1	
	1876	53	23	6	5	
	1877	61	21	3	8	
	1878	61	21	3	8	
	1879	62	20	3	8	
	1880	62	20	3	8	
	1881	64	20	2	11	
	1882	53	22	2	9	
	1883	53	23	3	6	
	1884	39	20	2	6	
	1885	38	22	1	4	
	1886	41	22	1	6	
	1887	43	20	1	6	
	1888	44	15	1	7	
	1889	40	15	1		
	1890	38	15	1		
	1891	39	15	1		
	1892	41	15	1		
	1893	40	14	1		
	1894	38	13	1		
	1895	39	12			
	1896	37	12			
	1897	37	12			
	1898	36	12			
	1899	34	11			
	1900	34	11			
	1901	34	10			
	1902	34	10			
	1903	33	10	.....	Clubs.	
	1904	33	8			
	1905	33	7			
	1906	31	7			
	1907	28	7			
	1908	28	7	.....	2	
St. Catharines	1886	26	7			
	1887	29	7			
	1888	23	7			
	1889	26	6			
	1890	26	5			
	1891	26	4			
	1892	26	3			
	1893	26	3			
	1894	26	3			
	1895	26	3			
	1896	26	2			
	1897	26	2			
	1898	22	2			
	1899	24	2			
	1900	22	2			
	1901	21	2			
	1902	24	2	.....	Clubs.	
	1903	19	2			
	1904	19	2			
	1905	18	2			
	1906	19	2	.....	1	
	1907	19	2	.....	1	
	1908	19	2	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brantford	1886	19	5	3		
	1887	18	5	3		
	1888	18	5	3		
	1889	18	5	3		
	1890	18	5	2		
	1891	18	5	1		
	1892	18	5	1		
	1893	18	5	1		
	1894	18	5	1		
	1895	16	5	1		
	1896	16	5	1		
	1897	16	5	.....	1	
	1898	16	4			
	1899	16	4			
	1900	17	4			
	1901	17	4			
	1902	16	4			
	1903	17	4	....	Clubs	
	1904	16	4			
	1905	17	4			
	1906	16	4			
	1907	16	4	.....	1	
	1908	16	4	.....	1	
St. Thomas	1899	20	6			
	1890	18	4			
	1891	18	4			
	1892	18	4			
	1893	18	4			
	1894	18	4			
	1895	18	4			
	1896	18	4			
	1897	18	3			
	1898	17	3			
	1899	17	4			
	1900	17	3			
	1901	17	2			
	1902	17	3			
	1903	17	3			
	1904	17	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Stratford	1889	21	4			
	1890	21	4			
	1891	21	4			
	1892	21	4			
	1893	19	4			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	16	2			
	1901	16	2			
	1902	16	2			
	1903	15	2			
	1904	15	2			
	1905	13	2			
	1906	15	2			
	1907	16	2			
	1908	16	2			
Guelph	1889	16	2			
	1890	16	2			
	1891	16	2			
	1892	16	2			
	1893	16	2			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	14	2			
	1901	15	2			
	1902	15	2			
	1903	15	2	.....	Clubs.	
	1904	15	2			
	1905	15	2			
	1906	15	2		1	
	1907	15	2		1	
	1908	15	2		1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Belleville	1889	25	3	2		
	1890	25	3	2		
	1891	25	3	2		
	1892	25	3	2		
	1893	24	3	2		
	1894	24	3	2		
	1895	25	3	2		
	1896	26	3	1		
	1897	26	3	1		
	1898	21	2	1		
	1899	17	2			
	1900	18	2			
	1901	18	2			
	1902	18	2			
	1903	17	2			
	1904	16	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			
Windsor	1891	22	4			
	1892	25	5			
	1893	27	4			
	1894	27	4			
	1895	27	4			
	1896	27	4			
	1897	27	3	1		
	1898	24	3	1		
	1899	22	3			
	1900	21	3			
	1901	23	3			
	1902	23	3			
	1903	23	3			
	1904	23	3			
	1905	19	3			
	1906	23	3			
	1907	23	3			
	1908	23	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Chatham	1895	17	2			
	1896	18	2			
	1897	17	2			
	1898	16	2			
	1899	15	2			
	1900	15	2			
	1901	15	2			
	1902	15	2			
	1903	15	2			
	1904	15	2			
	1905	12	2			
	1906	13	2			
	1907	13	2			
	1908	14	2			
Woodstock	1903	12	2			
	1904	12	2			
	1905	9	2			
	1906	9	2			
	1907	8	2			
	1908	9	2			
					Club.	
Peterborough	1907	20	4	.....	1	
	1908	19	4	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Concluded.

RECAPITULATION, showing the total number of Provincial licenses issued in the several counties in the province, including the cities, during the license years 1874-5-6-7-8-9-80-1-2 3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8.

Years.	Tavern.	Shop.	Wholesale	Vessel.	Club.	Total.
1874	4,793	1,307	52	33	.....	6,185
1875	4,459	1,257	78	24	.....	5,818
1876	2,977	787	147	27	.....	3,938
1877	2,845	739	65	27	.....	3,676
1878	2,910	724	52	29	.....	3,715
1879	3,199	757	42	22	.....	4,020
1880	3,227	760	40	22	.....	4,049
1881	3,311	764	34	24	.....	4,133
1882	3,317	787	35	24	.....	4,163
1883	3,363	781	36	21	.....	4,201
1884	3,253	675	28	14	.....	3,970
1885	2,574	525	24	9	.....	3,132
1886	1,567	367	28	12	.....	1,974
1887	1,496	325	28	13	.....	1,862
1888	2,066	336	26	17	.....	2,445
1889	3,073	445	37	15	.....	3,560
1890	3,071	428	24	.....	.....	3,523
1891	2,990	403	21	.....	.....	3,414
1892	2,966	378	25	.....	.....	3,369
1893	2,888	357	31	.....	.....	3,276
1894	2,785	337	29	.....	.....	3,151
1895	2,779	327	26	.....	.....	3,132
1896	2,747	323	26	.....	.....	3,096
1897	2,725	317	22	.....	.....	3,064
1898	2,641	312	23	.....	.....	2,976
1899	2,611	308	21	.....	.....	2,950
1900	2,621	303	24	.....	.....	2,948
1901	2,613	308	26	.....	.....	2,947
1902	2,628	307	22	.....	.....	2,957
1903	2,577	300	22	.....	.....	2,899
1904	2,516	298	22	.....	.....	2,836
1905	2,384	283	24	.....	.....	2,691
1906	2,207	267	23	.....	24	2,521
1907	2,110	262	25	.....	35	2,432
1908	2,010	253	23	.....	42	2,328

The Six Months' Licenses and the Licenses *extended* do not appear in the above Schedule or recapitulation. Beer and Wine Licenses are included with the ordinary licenses, under the heads of Tavern Licenses and Vessel Licenses respectively. An *extended* License is good for a period not exceeding three months. It is not in the nature of a new License, but simply a permission, granted by the Board of Commissioners to the holder of a License expiring in April, to continue his business under the old license for the specified period, that he may be able to dispose of his stock on hand and quit the business without loss. Six Months' Licenses run from the first day of May to the thirty-first day of October, and are not valid after the latter date. They are granted to localities which are largely resorted to in summer by visitors, where the Board of Commissioners are of the opinion that increased tavern accommodation for the summer months is necessary.

SCHEDULE B.

SCHEDULE B.

STATEMENT BY MUNICIPALITIES, showing the number of Provincial Licenses, whether ordinary, Beer and Wine, or Club, issued; the number extended or transferred; number of bartenders' licenses issued; the sums deposited to the credit of the License Fund Accounts for licenses only; the revenue paid over to the Municipal treasurers, and the amounts received by the Province from licenses for the license year 1908-9.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c
Addington	Newburg, Village	1					1			1		250 00	75 00	75 00
	Camden	6		1			7			2		780 00	234 00	234 00
	Sheffield	5					5			2		600 00	180 00	180 00
	Kalader and Anglesea	1	1				2					210 00	63 00	63 00
	Barrie	1					1					120 00	36 00	36 00
	Kennebec	1					1					120 00	36 00	36 00
	Olden													
	Oso	2					2					240 00	72 00	72 00
	Hinchinbrooke	2					2					240 00	72 00	72 00
	Palmerston and Canonto	1					1					120 00	36 00	36 00
	Clarendon and Millar													
	Denbigh													
	Transferred from previous year													
	Totals	20	1	1			22			5		2,680 00	804 00	804 00

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
A'goma	*St. Joseph													
	Hilton	1					1				1	122 00	56 40	56 40
	Thessalon, Town	3					3			2	7	764 00	353 18	353 17
	*Thessalon, Township													
	Plummer, add'l													
	Hallam													
	Salter and May and 116													
	*Johnson, Tarbutt, etc.													
	*Denison, Drury and Graham													
	Blind River	4					4			1	24	3,048 00	1,414 29	1,414 29
	Webbwood	2					2			1	7	514 00	231 30	231 30
	*McDonald, Meredith, etc.													
	Bruce Mines, Town	2					2					500 00	231 25	231 25
	Massey, Town	2					2				4	508 00	231 78	231 77
	Thompson													
	†Unorganized Territory	4					4			1	3	486 00		440 60
	Transferred from previous year											687 92		
	Totals	18					18			5	46	6,629 92	2,518 20	2,958 78

* Local Option. † Payable to Province, less proportion of expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Brant.	South Dumfries	2	...	.. ..	.....	.....	2	.....	...	.....	.....	240 00	96 00	96 00
	Brantford Township	3	.....	.....	.....	.....	3	....	.....	.....	.....	360 00	144 00	144 00
	*Onondaga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Paris, Town	6	.....	.....	1	.....	7	.....	.....	.....	9	2,468 00	987 20	987 20
	Transferred from previous year	....	.....	.....	.....	.....	.....	.....	....	.....	.....	17 40	.....	.....
	Totals	11	.....	.....	1	.....	12	.....	.....	.....	9	3,085 40	1,227 20	1,227 20
South Brant..	Brantford Township	2	.....	.....	.....	.....	2	.....	.....	2	.....	240 00	64 30	64 30
	Burford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	51 80	51 80
	Oakland	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	25 91	25 90
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....
	Totals	5	.....	.....	.....	.....	5	.....	.....	2	.....	600 00	142 01	142 00
Brantford City	.....	16	.... .	.....	4	1	21	.....	.....	.....	47	10,144 00	4,791 79	4,791.79
	Transferred from previous year	.....	... .	.....	.....	.....	.....	.....	.....	.....	.....	418 90	....	.....
	Totals	16	.....	.....	4	1	21	.....	.....	.....	47	10,562 90	4,791 79	4,791 79
Brockville ...	Brockville, Town	9	.....	.....	2	1	12	.....	.....	3	17	6,154 00	2,968 77	2,968 76
	Rear of Yonge and Escott	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	86 40	86 40
	Elizabethtown	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	57 90	57 90
	Athens, Village	2	.....	.....	.....	.....	2	.....	.....	....	.....	500 00	241 25	241 25
	Elmsley	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	56 40	56 40
	Kitley	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	169 20	169 20
	Transferred from previous year	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	358 20	.....	.....
	Totals	17	.....	1	2	1	21	.....	.....	3	17	7,792 20	3,579 92	3,579 91

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Bruce.	Paisley, Village	3					3					750 00	328 12	328 13
	Kincardine, Town	5			1		6			3	12	2,124 00	929 26	929 24
	Chesley, Town	3					3				7	764 00	334 24	334 25
	Greenock	5					5					600 00	262 50	262 50
	*Huron													
	Kincardine, Township	1					1					120 00	52 50	52 50
	Elderslie													
	Transferred from previous year											337 92		
	Totals	17			1		18			3	19	4,695 92	1,906 62	1,906 62
North Bruce..	Tiverton, Village	1					1			1		250 00	79 17	79 17
	Port Elgin, Village	3		1			4			1		875 00	275 00	275 00
	*Southampton, Village													
	*Tara, Village													
	Wiarton, Town	5					5				13	1,776 00	556 53	556 53
	*Bruce													
	*Saugeen													
	*Arran													
	*Amabel													
	Eastnor	3					3			1		360 00	112 00	112 00
	Albemarle	1					1					135 00	42 75	42 75
	Lindsay and St. Edmunds													
	St. Edmunds, Township													
	Transferred from previous year											3 20		
	Totals	13		1			14			3	13	3,399 20	1,065 45	1,065 45

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Bruce..	Lucknow, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	328 13	328 13
	Teeswater, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	328 13	328 13
	Walkerton, Town	6	.....	.....	1	.....	7	.....	.....	1	6	2,462 00	1,077 13	1,077 11
	Culross	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Carrick	7	.....	.....	.....	.....	7	.....	.....	2	.....	840 00	367 50	367 50
	Brant	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	210 00	210 00
	Kinloss	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	178 66	.....	.....
	Totals	25	.....	.....	1	.....	26	.....	.....	3	6	5,700 66	2,415 89	2,415 87
Carleton	Richmond, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	25 00	25 00
	*March	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Huntley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Gower	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	36 00	36 00
	*Goulborn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Marlborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fitzroy	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	24 00	24 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	6	.....	.....	.....	.....	6	.....	.....	.....	.....	850 00	85 00	85 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Dufferin	Orangeville, Town	6			1		7			1	3	2,456 00	921 00	921 00
	*Mulmur													
	*Mono													
	*Melancthon													[illegible]
	*Garafraxa, East													60 1[illegible]
	Shelburne, Village	3					3					1,200 00	450 00	40 50
	*Amaranth													6 8[illegible]
	*East Luther													
	Grand Valley, Village	3					3					750 00	281 26	281 24
	Transferred from previous year													
	Totals	12			1		13			1	3	4,406 00	1,652 26	1,652 24
Dundas	Iroquois, Village	2					2					520 00	203 67	203 67
	Chesterville, Village	3					3					780 00	318 14	318 14
	Morrisburg, Village	3					3					750 00	293 75	293 75
	Winchester, Township													
	Williamsburg													
	*Winchester, Village													
	*Mountain													
	Transferred from previous year											193 00		
	Totals	8					8					2,243 00	815 56	815 56

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
E. Durham...	Port Hope, Town	8	.....	.....	1	.....	9	.....	.....	2	8	3,326 00	1,350 95	1,350 93
	*Millbrook, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hope	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cavan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Manvers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	143 58	.....	.....
	Totals	8	.....	.....	1	.....	9	.....	.....	2	8	3,469 58	1,350 95	1,350 93
W. Durham...	Bowmanville, Town	3	.....	.....	.....	.....	3	.....	.....	1	1	1,052 00	263 00	263 00
	Newcastle, Village	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	62 50	62 50
	*Clarke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Darlington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cartwright	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26 67	.....	.....
	Totals	4	.....	.....	.....	.....	4	.....	.....	2	1	1,328 67	325 50	[illegible]
East Elgin....	Aylmer, Town	4	.....	.....	.....	.....	4	.....	.....	1	12	1,424 00	605 20	605 20
	Port Stanley, Village	2	.....	1	.....	.....	3	.....	.....	2	.....	650 00	273 00	273 00
	Springfield, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	106 25	106 25
	Vienna, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	106 25	106 25
	*Yarmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Malahide	.....	.....	1	.....	.....	1	.....	.....	.....	.....	60 00	24 00	24 00
	Bayham	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	255 00	255 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	230 95	.....	.....
	Totals	13	.....	2	.....	.....	15	.....	.....	3	12	3,464 95	1,369 70	1,369 70

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Elgin...	St. Thomas, City	16	.....	.....	3	.....	19	.....	.....	.....	27	9,554 00	4,418 20	4,418 20
	*Southwold	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dunwich	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	111 00	111 00
	Aldborough	1	.....	.....	.....	.....	1	.....	.....	.....	.....	130 00	60 13	60 12
	Dutton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	520 00	240 50	240 50
	West Lorne, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	346 87	346 88
	Rodney, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	231 25	231 25
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	172 20	.....	.....
	Totals	26	.....	.....	3	.....	29	.....	.....	.....	27	14,866 26	5,407 95	5,407 95
North Essex..	Maidstone	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	143 75	143 75
	Rochester	5	.....	.....	.....	.....	5	.....	.....	3	.....	660 00	238 75	238 75
	East Sandwich	15	.....	.....	1	.....	16	3	.....	2	.....	2,090 00	833 34	833 33
	West Sandwich	12	.....	1	.....	.....	13	.....	.....	3	.....	1,500 00	600 00	600 00
	Belle River, Village	3	.....	.....	1	.....	4	.....	.....	1	.....	1,020 00	408 96	408 96
	Anderdon	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	95 00	95 00
	Tilbury N.	3	.....	.....	.....	.....	3	.....	.....	1	.....	600 00	239 58	239 58
	South Sandwich	2	.....	.....	.....	.....	2	.....	.....	2	.....	240 00	95 00	95 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	45	.....	1	2	.....	48	3	.....	14	.....	6,650 00	2,654 38	2,654 37

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Essex..	*Mersea	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Leamington, Town	3	.....	.....	1	.....	4	.....	.....	2	4	1,408 00	598 40	598 40
	Amherstburg, Town	5	.....	.....	1	.....	6	.....	.....	1	11	2,122 00	910 45	910 45
	Malden	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	102 00	102 00
	*Gosfield, South	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Kingsville, Town	2	.....	.....	.....	.....	2	.....	.....	.....	3	506 00	218 13	218 12
	Essex, Town	3	.....	.....	.....	.....	3	.....	.....	1	4	818 00	350 82	350 82
	*Colchester, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Colchester, South	1	.....	.....	.....	.....	1	1	.....	1	.....	218 75	91 88	91 87
	Pelee Island	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	51 00	51 00
	Tilbury, West	3	.....	.....	.....	.....	3	.....	.....	.....	.....	525 00	223 12	223 13
	Gosfield, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61 87	.....	.....
	Totals	20	.....	.....	2	.....	22	1	.....	6	22	6,019 62	2,545 80	2,545 79
Fort William.	Fort William	13	.....	.....	3	.....	16	.....	.....	2	62	8,124 00	3,793 65	3,793 65
	Paipoonge	1	.....	.....	.....	.....	1	.....	.....	....	1	202 00	94 45	94 45
	†Unorganized	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	.....	110 40
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	218 53	.....	.....
	Totals	15	.....	.....	3	.....	18	.....	.....	2	63	8,664 53	3,888 10	3,998 50

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Frontenac ...	Portsmouth, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	150 00	150 00
	*Kingston, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Portland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pittsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Storrington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wolfe Island	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	72 00	72 00
	Loughboro	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	72 00	72 00
	Bedford	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	36 00	36 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	187 07	.....	.....
	Totals	7	.....	.....	.....	.....	7	.....	.....	.....	.....	1,287 07	330 00	330 00
Glengarry	Alexandria	3	.....	.....	.....	.....	3	2	.....	.....	5	1,235 00	463 13	463 12
	Charlottenburg	4	.....	1	.....	.....	5	.....	.....	4	.....	900 00	337 50	337 50
	Lancaster, Township	2	.....	.....	.....	.....	2	.....	.....	.....	.....	250 00	93 76	93 75
	Kenyon	4	.....	.....	.....	.....	4	.....	.....	.....	.....	500 00	187 50	187 50
	Lochiel	2	.....	.....	.....	.....	2	1	.....	.....	.....	337 50	126 57	126 56
	Lancaster, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	187 50	187 50
	Maxville, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	187 50	187 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17 51	.....	.....
	Totals	19	.....	1	.....	.....	20	3	....	6	5	4,240 01	1,583 46	1,583 43

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Grenville	Prescott, Town	5	.....	....	2	.....	7	.....	.....	.....	14	2,478 00	1,053 16	1,053 14
	*Cardinal, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Kemptville, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	318 75	318 75
	Merrickville, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	212 50	212 50
	Augusta	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	102 00	102 00
	Wolford	1	.....	....	.....	.....	1	.....	.....	.....	.....	120 00	51 00	51 00
	Oxford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	102 00	102 00
	Edwardsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58 85	.....	.....
	Totals	15	.....	.....	2	.....	17	.....	.....	1	14	4,386 85	1,839 41	1,839 39
Centre Grey..	*Thornbury, Town.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Artemesia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Holland	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	60 00	60 00
	*Collingwood, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
	*Euphrasia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Osprey	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sullivan	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	30 00	30 00
	Markdale	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	187 50	187 50
	Chatsworth, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	62 50	62 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	96 79	.....	.....
	Totals	7	.....	.....	.....	.....	7	.....	.....	.....	.....	1,456 79	340 00	340 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c	$ c.
North Grey...	*Owen Sound, Town	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....
	Meaford, Town	3	.....	.....	.....	.....	3	.....	.....	.....	5	1,060 00	397 51	397 49
	*Derby	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Keppell	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sydenham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	St. Vincent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sarawak	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	850 00†	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73 87	.....	.....
	Totals	3	.....	.....	....	.....	3	.....	.....	.....	5	1,983 87	397 51	397 49
South Grey...	*Proton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Durham, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bentinck	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	107 25	107 25
	Glenelg	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Normanby	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	262 50	262 50
	*Egremont	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dundalk, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	328 13	328 12
	Hanover, Town	4	.....	.....	.....	.....	4	.....	.....	.....	6	1,412 00	617 60	617 60
	Neustadt Village	2	.....	1	.....	.....	3	.....	.....	.....	.....	625 00	282 81	282 82
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	306 18	.....	.....
	Totals	17	.....	1	.....	.....	18	.....	.....	.....	6	4,053 18	1,650 79	1,650 79

* Local Option. † Transferred from L.O.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Haldimand ...	Cayuga, Village	3	.....	.....	.....	.....	3	.....	1	2	.....	817 50	363 82	363 81
	Caledonia, Village	3	.....	.....	1	.....	4	....	....	1	....	1,020 00	454 75	454 75
	Oneida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cayuga, North, Township	1	.....	.....	.....	.....	1	1	.....	.....	.....	150 00	66 00	66 00
	Dunn	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	78 50	78 50
	Rainham	4	.....	.....	.....	.....	4	.....	.....	1	.....	480 00	214 00	214 00
	Walpole	3	.....	.....	.....	.....	3	1	.....	1	.....	390 00	176 50	176 50
	Seneca	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	108 75	108 75
	Hagersville, Village	3	.....	.....	.....	.....	3	.....	.....	1	.....	750 00	334 38	334 37
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	387 92	.....	.....
	Totals	20	.....	1	1	.....	22	2	1	6	.....	4,415 42	1,796 70	1,796 68
Haliburton ...	Minden	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Dysart	1	.....	.....	.....	.....	1	.....	.. .	.....	.....	120 00	45 00	45 00
	Anson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Sherbourne	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	90 00	90 00
	Glamorgan	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Snowden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stanhope	.. .	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	149 02	.....	.....
	Totals	6	.....	.....	.....	.....	6	.....	.....	.....	.....	869 02	270 00	270 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
Halton	Nelson			1			1					$ c. 100 00	$ c. 43 75	$ c. 43 75
	*Nassagaweya													
	Esquesing	4					4			2		480 00	210 00	210 00
	Burlington, Village	2					2					500 00	218 75	218 75
	Georgetown, Village	3					3					750 00	328 12	328 13
	Oakville, Town	2					2			1	2	504 00	220 50	220 50
	Milton, Town	3					3				3	756 00	330 76	330 75
	Acton, Village	3					3			1		750 00	328 12	328 12
	*Trafalgar													
	Transferred from previous year											409 99		
	Totals	17		1			18			4	5	4,249 99	1,680 00	1,680 00
Hamilton	Hamilton, City	68	1		17	3	89			10	123	60,421 00	29,360 50	29,360 50
	Transferred from previous year											443 54		
	Totals	68	1		17	3	89			10	123	60,864 54	29,360 50	29,360 50
East Hastings	Tyendinaga	5					5					600 00	233 25	233 25
	Hungerford	2					2					250 00	96 88	96 87
	Thurlow	3		1			4					420 00	159 00	159 00
	Deseronto, Town	4			1		5				5	1,760 00	681 87	681 88
	Tweed, Village	3			1		4					1,020 00	395 25	395 25
	Transferred from previous year											113 86		
	Totals	17		1	2		20				5	4,163 86	1,566 25	1,566 25

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Hastings	Marmora and Lake	1					1					120 00	45 00	45 00
	*Huntingdon													
	*Stirling, Village													
	*Madoc, Township													
	Elzevir and Grimsthorpe	2					2					240 00	84 00	84 00
	Tudor and Cashel	2					2					240 00	72 00	72 00
	Wollaston	1	7 mos.				1					70 00	22 00	22 00
	Monteagle and Herschel	2					2			3		240 00	90 00	90 00
	*Rawdon													
	Madoc, Village	2					2		1	1		610 00	222 00	222 00
	Wicklow and Bangor	1	8½ mos				1					85 00	34 00	34 00
	Dungannon	1					1			1		120 00	45 00	45 00
	Carlow and Mayo									1				
	Limerick													
	Faraday													
	Marmora, Village	2			1		3		1	1		860 00	296 50	296 50
	Bancroft, Village	2			1†		2		1	1		590 00.	214 50	214 50
	Transferred from previous year											200 06		
	Totals	16			1		17		3	6		3,375 06	1,125 00	1,125 00
West Hastings	Belleville, City	16			3		19			4	22	8,594 00	3,975 13	3,975 12
	Trenton, Town	7			2		9				11	3,172 00	1,467 28	1,467 27
	Sidney	3					3			1		360 00	166 50	166 50
	Transferred from previous year											445 97		
	Totals	26			5		31			5	33	12,571 97	5,608 91	5,608 89

* Local Option. † Four Months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Huron...	Grey	3	1	.....	.....	.....	4	.....	.....	.....	.....	450 00	168 76	168 74
	McKillop	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Hullett, east part	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Morris	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	90 00	90 00
	*Howick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Turnberry	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Brussels, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	281 25	281 25
	Wroxeter, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	93 75	93 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	233 45	.....	.....
	Totals	11	1	.....	.....	.....	12	.....	.....	.....	.....	2,163 45	723 76	723 74
South Huron..	Exeter, Village	4	.....	.....	1	.....	5	.....	.....	2	.....	1,270 00	563 57	563 56
	Seaforth, Town	5	.....	.....	1	.....	6	.....	.....	1	7	2,114 00	938 05	938 05
	Goderich Tp., S. part	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bayfield	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	221 88	221 87
	Stephen	8	.....	.....	.....	.....	8	.....	.....	1	.....	960 00	426 00	426 00
	*Usborne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hay	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	159 75	159 75
	Tuckersmith	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	106 50	106 50
	*Stanley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hensall, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50 00	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	293 11	.....	.....
	Totals	24	.....	.....	2	.....	26	.....	.....	4	7	5,787 11	2,415 75	2,415 73

* Local option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Huron ..	Goderich, Town	8	.....	.....	1	.....	9	....	.....	.....	5	3,160 00	1,457 51	1,457 50
	*Wawanosh, East	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hullett	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wawanosh, West	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wingham, Town	5	.....	.....	.....	.....	5	.....	.....	2	4	1,758 00	810 88	810 87
	Clinton, Town	5	.....	.....	1	.....	6	.....	.....	2	10	2,120 00	977 47	977 47
	Ashfield	4	.....	.....	.....	.....	4	....	.....	.....	.....	480 00	221 40	221 40
	Colborne	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	110 70	110 70
	Blyth, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	230 62	230 63
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	402 43	.....	.....
	Totals	26	.....	.....	2	.....	28	.....	.....	4	19	8,660 43	3,808 58	3,808 57
Kenora East..	Van Horne	2	.....	.....	.....	.....	2	.....	.....	.....	1	242 00	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85 54	.....	.....
	Totals	2	.....	.....	.....	.....	2	.....	.....	.....	1	327 54	.....	.....
Kenora West.	Kenora, Town	9	.....	.....	2	1	12	.....	.....	.....	55	5,210 00	2,279 38	2,279 37
	Keewatin	3	.....	.....	1	.....	4	.....	.....	.....	7	1,264 00	553 00	553 00
	Unorganized Districts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from Kenora East	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17 41	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93 90	.....	.....
	Totals	12	.....	.....	3	1	16	.....	.....	.....	62	6,585 31	2,832 38	2,832 37

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Kent....	Howard	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 75	48 75
	Blenheim, Town	3	.....	.....	.....	.....	3	.....	.....	.....	6	822 00	333 82	333 81
	Dresden, Town	2	.....	.....	.....	.....	2	.....	.....	1	2	544 00	220 88	220 87
	Thamesville, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	202 87	202 88
	*Camden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bothwell, Town	2	.....	.....	1	.....	3	.....	.....	.....	1	772 00	313 56	313 56
	Harwich	2	.....	.....	.....	.....	2	.....	.....	.....	.....	250 00	101 56	101 57
	Orford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	97 50	97 50
	Ridgetown, Town	2	.....	.....	1	.....	2	.....	.....	1	8	1,066 00	433 06	433 06
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34 19	.....	.....
	Totals	16	.....	.....	2	.....	18	.....	.....	2	17	4,348 19	1,752 00	1,752 00
West Kent....	Chatham, City	14	.....	.....	2	.....	16	.....	.....	2	22	7,244 00	3,458 86	3,458 86
	Chatham, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dover	7	.....	.....	.....	.....	7	.....	.....	.....	.....	840 00	402 00	402 00
	Wallaceburg	4	.....	.....	1	.....	5	.....	.....	2	4	1,758 01	844 67	844 67
	*Raleigh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tilbury, Village	4	.....	.....	.....	.....	4	.....	.....	.....	.....	1,000 00	477 50	477 50
	*Tilbury, East	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	329 96	.....	.....
	Totals	29	.....	.....	3	.....	32	.....	.....	4	26	11,171 97	5,183 03	5,183 03

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Kingston	Kingston, City.....	28	.....	.....	7	2	37	....	. ...	2	39	17,678 00	8,305 35	8,305 35
	Transferred from previous year	.....	.....	.....	.....	.....	.....	....	.....	....	.....	109 60	.....	.....
	Totals	28	.....	.....	7	2	37	.....	.....	2	39	17,787 60	8,305 35	8,305 35
East Lambton.	Bosanquet	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 00	50 00
	Forest, Town	2	.....	.....	.....	.....	2	.....	.....	.....	2	504 00	210 00	210 01
	*Warwick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Brooke	1	.....	.....	.....	.....	1	.....	.....	.....	.....	150 00	62 50	62 50
	Wyoming, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	208 33	208 33
	Watford, Village	3	.....	.....	.....	.....	3	.....	.....	2	.....	750 00	312 50	312 50
	*Euphemia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Plympton	1	.....	.....	.....	.....	1	.....	.....	.....	.....	160 00	66 67	66 67
	*Arkona, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Thedford, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	208 33	208 33
	Alvinston, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	312 50	312 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	179 23	.....	.....
	Totals	15	.....	.....	.....	.....	15	.....	.....	2	2	3,613 23	1,430 83	1,430 84

* Local Option

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
West Lambton	Petrolea, Town	5	.....	.....	1	.....	6	.....	.....	.....	6	$ c. 2,112 00	$ c. 987 33	$ c. 987 33
	*Moore	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sarnia, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sombra	5	.....	.....	.....	.....	5	.....	.....	3	.....	625 00	292 19	292 19
	Oil Springs, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	350 63	350 62
	*Enniskillen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sarnia, Town	10	.....	.....	2	.....	12	1	.....	1	17	5,546 50	2,592 01	2,592 01
	Point Edward, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	350 62	350 63
	*Dawn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	225 20	.....	.....
	Totals	26	.....	.....	3	....	29	1	.....	4	23	10,008 70	4,572 78	4,572 78
North Lanark.	Lanark, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	200 00	200 00
	Pakenham	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	144 00	144 00
	*Dalhousie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Almonte, Town	4	.....	.....	.....	.....	4	.....	.....	.....	9	1,418 00	567 20	567 20
	Carleton Place, Town	6	.....	.....	.....	.....	6	.....	.....	1	8	2,116 00	846 40	846 40
	Ramsey	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	96 00	96 00
	*Lanark, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Lavant	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	Darling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	18	.....	.....	.....	.....	18	.....	.....	2	17	4,754 00	1,901 60	1,901 60

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Lanark.	Perth, Town	7	.....	.....	2	.....	9	.....	.....	.....	12	3,174 00	1,388 63	1,388 62
	Smith's Falls, Town	7	.....	.....	1	.....	8	.....	.....	2	12	3,624 00	1,585 51	1,585 49
	Beckwith	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Bathurst	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Drummond	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	105 00	105 00
	*South Sherbrooke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 20	.....	.....
	Totals	17	.....	.....	3	.....	20	.....	.....	2	24	7,159 20	3,131 64	3,131 61
Leeds	Gananoque	4	.....	1	.....	.....	5	.....	2	.....	5	1,760 00	792 00	792 00
	Newboro', Village	1	.....	1	.....	.....	2	.....	.....	.....	.....	375 00	168 75	168 75
	Bastard and Burgess	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	108 00	108 00
	North Crosby	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Leeds and Lansdowne, front	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Leeds and Lansdowne, rear	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	108 00	108 00
	South Crosby	1	.....	1	.....	1	3	.....	.....	.....	.....	230 00	103 50	103 50
	Yonge and Escott, front	1	1	.....	.....	.....	2	.....	.....	.....	.....	350 00	161 88	161 87
	Westport, Village	3	.....	.....	.....	.....	3	.....	.....	1	.....	750 00	337 50	337 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	389 16	.....	.....
	Totals	14	1	3	.....	1	19	.....	2	1	5	4,334 16	1,779 63	1,779 62

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Lennox	Napanee, Town	6			2		8				7	2,814 00	1,172 51	1,172 50
	Bath, Village	1					1					250 00	104 16	104 17
	Adolphustown													
	Amherst Island	1					1					120 00	50 00	50 00
	Ernestown	2					2					240 00	100 00	100 00
	North Fredericksburg													
	*Richmond													
	Transferred from previous year											249 85		
	Totals	10			2		12				7	3,673 85	1,426 67	1,426 67
Lincoln	*Niagara, Township													
	*Grimsby, North													
	Grantham	1					1					120 00	45 00	45 00
	Merriton, Village	3					3					750 00	281 25	281 25
	*Grimsby, South													
	Port Dalhousie, Village	3					3					750 00	281 24	281 25
	*Clinton													
	*Grimsby, Village													
	Niagara Town	3		1	1		5				3	1,151 00	431 62	431 63
	*Beamsville, Village													
	Louth	1					1					120 00	45 00	45 00
	Transferred from previous year											10 60		
	Totals	11		1	1		13				3	2,901 60	1,084 12	1,084 13

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
London	London, City	26			5	2	33			4	73	21,946 00	9,984 33	9,984 33
	Transferred from previous year											45		
	Totals	26			5	2	33			4	73	21,946 45	9,984 33	9,984 33
Manitoulin	‡Drury, Denison, etc.										2	4 00	1 50	1 50
	Little Current, Town	3					3			2	11	772 00	327 60	327 60
	Gore Bay, Town	2					2	1			5	572 50	233 84	233 84
	Assignac	1					1				1	122 00	51 95	51 95
	Howland	1					1					120 00	51 00	51 00
	Gordon													
	*Tehkummah													
	Billings	1					1					120 00	51 00	51 00
	Carnarvon	1					1			1		120 00	51 00	51 00
	May, Slater and Massey													
	Nairn, Lorne and Hyman	2					2			1	6	252 00	106 90	196 90
	Hallam													
	Graham													
	Cockburn Island													
	†Unorganized Territory	2					2				3	246 00		196 90
	Transferred from previous year											673 35		
	Totals	13					13	1		4	28	3,001 85	874 79	1,071 69

* Local Option. † Payable to Province, Less Expenses. ‡ See Sudbury.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Middlesex	London, Township	11	1	.....	.....	.....	12	.....	.....	6	.....	1,410 00	458 25	458 25
	Dorchester	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	117 00	117 00
	Westminster	4	.....	.....	.....	.....	4	.....	.....	2	.....	480 00	156 00	156 00
	*Nissouri	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	London West, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 80	.....	.....
	Totals	18	1	.....	.....	.....	19	.....	.....	9	.....	2,255 80	731 25	731 25
North Middlesex	*East Williams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	McGillivray	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Adelaide	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	84 00	84 00
	Biddulph	3	.....	.....	.....	.....	3	.....	.....	1	.....	405 00	141 75	141 75
	Ailsa Craig, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	175 00	175 00
	Lobo	2	.....	.....	.....	.....	2	.....	.....	1	.....	230 00	80 00	80 00
	Parkhill, Town	3	.....	.....	.....	.....	3	.....	.....	.....	6	762 00	272 95	272 95
	Lucan, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	262 50	262 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 80	.....	.....
	Totals	15	.....	.....	.....	.....	15	.....	.....	3	6	2,888 80	1,016 20	1,016 20

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Middlesex	Ekfrid	2					2					240 00	102 00	102 00
	Strathroy, Town	5					5				6	1,762 00	763 33	763 34
	Wardsville, Village	1					1					250 00	108 34	108 33
	Metcalfe	1					1					120 00	52 00	52 00
	Delaware	1					1					120 00	50 00	50 00
	Caradoc	2					2					240 00	102 00	102 00
	Glencoe, Village	3					3			1		780 00	338 00	338 00
	Mosa													
	Newbury, Village	1					1			1		250 00	108 33	108 33
	Transferred from previous year											240 55		
	Totals	16					16			2	6	4,002 55	1,624 00	1,624 00
Monck	Wainfleet	1					1					120 00	45 00	45 00
	Canborough	1					1					120 00	45 00	45 00
	*Caistor													
	Sherbrooke	1		1			2					180 00	67 50	67 50
	Dunville, Town	5			1		6			1	6	2,112 00	792 00	792 00
	*Gainsborough													
	*Pelham													
	Moulton													
	Transferred from previous year											32 61		
	Totals	8		1	1		10			1	6	2,564 61	949 50	949 50

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Muskoka	*McLean and Ridout	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Draper	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	51 00	51 00
	Gravenhurst, Town	3	.....	.....	.....	.....	3	.....	.....	1	9	1,068 00	445 00	445 00
	Medora and Wood	1	.....	2	.....	.....	3	.....	.....	.....	4	248 00	99 60	99 60
	Bracebridge, Town	4	.....	.....	1	.....	5	.....	.....	1	11	1,922 00	816 70	816 70
	Huntsville, Town	4	.....	.....	.....	.....	4	.....	.....	1	8	1,416 00	601 50	601 50
	Monck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Morrison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stisted	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stephenson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	McAuley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Port Carling, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chaffey	.....	.....	1	.....	.....	1	.....	.....	.....	.....	60 00	24 00	24 00
	Ryde	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	.....	.....	4	.....	.....	4	.....	.....	3	.....	240 00	.....	192 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175 68	.....	.....
	Totals	14	.....	7	1	.....	22	.....	.....	6	32	5,369 68	2,085 80	2,277 80

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Nipissing	North Bay, Town	7	.....	.....	2	.....	9	1	.....	.....	22	4,306 50	1,884 09	1,884 09
	McKim	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mattawa, Town	4	.....	.....	2	.....	6	.....	.....	1	7	2,094 00	916 13	916 12
	Widdifield	1	.....	.....	.....	.....	1	.....	.....	.....	1	122 00	53 38	53 37
	Bonfield, Town	2	.....	.....	.....	.....	2	.....	.....	.....	3	506 00	221 37	221 38
	Head, Clara and Maria	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	157 50	157 50
	*Jocelyn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ferris	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Milberta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bonfield	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	20 84	9 12	9 12
	†Unorganized Territory	1	.....	2	.....	.....	3	.....	.....	.....	2	244 00	.....	213 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 43	.....	.....
	Totals	19	.....	2	4	.....	25	2	.....	1	35	7,795 77	3,294 09	3,507 58
North Norfolk.	Middleton	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 00	50 00
	Simcoe, Town	4	.....	.....	2	.....	6	.....	.....	2	6	2,112 00	880 00	880 00
	*Windham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Waterford, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Delhi, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	208 32	208 33
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	210 15	.....	.....
	Totals	7	.....	.....	2	.....	9	.....	.....	3	6	2,942 15	1,138 32	1,138 33

*Local Option. †Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Norfolk	Walsingham, South	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	84 00	84 00
	Woodhouse	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Charlotteville	1	1	.....	.....	.....	2	.....	.....	.....	.....	210 00	73 50	73 50
	Houghton	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	Port Dover, Village	3	.....	.....	.....	.....	3	.....	.....	1	.....	750 00	262 50	262 50
	*Walsingham, North.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Rowan, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	175 00	175 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	9	1	.....	.....	.....	10	.....	.....	1	.....	1,820 00	637 00	637 00
East Northumberland	*Seymour	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Murray	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cramahe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Percy	2	.....	.....	.....	.....	2	.....	.....	.....	.....	300 00	98 44	98 44
	*Colborne, Village	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Campbellford, Town	.....	.....	....	.....	.....	.....	.....	.....	1	2	4 00	1 00	1 00
	Hastings, Village	2	.....	.....	1	.....	3	.....	.....	.....	.....	770 00	240 62	240 63
	*Brighton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	176 32	.....	.....
	Totals	4	.....	.....	1	.....	5	.....	.....	1	2	1,250 32	340 06	340 07

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Northumberland	Alnwick	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	75 00	75 00
	*South Monaghan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Haldimand, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hamilton, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cobourg, Town	9	.....	1	2	.....	12	.....	.....	4	22	4,069 00	1,695 42	1,695 42
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	634 44	.....	.....
	Totals	10	.....	2	2	.....	14	.....	.....	4	22	4,883 44	1,770 42	1,770 42
North Ontario	Uxbridge, Town	4	.....	.....	1	.....	5	.....	.....	2	6	1,282 00	427 34	427 33
	Brock	2	1	.....	.....	.....	3	.....	.....	1	.....	330 00	110 00	110 00
	Mara	2	.....	.....	.....	.....	2	2	.....	.....	.....	300 00	100 00	100 00
	Thorah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Uxbridge, Township	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	120 00	120 00
	*Scott	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Rama	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cannington, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	166 67	166 67
	Beaverton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	166 67	166 66
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	15	1	.....	1	.....	17	2	.....	3	6	3,272 00	1,090 68	1,090 66

* Local option.

SCHEDULE B.—Continued.

License District.	Municipality	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Ontario.	*Reach													
	Oshawa, Town	4					4				9	1,898 00	790 83	790 84
	Whitby, Town	4			1		5				3	1,756 00	731 67	731 66
	Whitby, Township	2					2					260 00	108 32	108 34
	Whitby, East, Township	2					2					260 00	108 34	108 32
	*Pickering, Township													
	Port Perry, Village	2			1		3					770 00	320 84	320 84
	Transferred from previous year											54 41		
	Totals	14			2		16				12	4,998 41	2,060 00	2,060 00
Ottawa	Ottawa, City	65			26	3	94	6	4	14	175	65,833 34	31,816 67	31,816 67
	Transferred from previous year											405 37		
	Totals	65			26	3	94	6	4	14	175	66,238 71	31,816 67	31,816 67
North Oxford.	*East Nissouri													
	Blandford	1					1					120 00	55 20	55 20
	East Zorra	2					2					240 00	110 40	110 40
	Embro, Village	2					2			2		500 00	230 00	230 00
	West Zorra													
	Woodstock, City	9			2		11			1	18	4,986 00	2,293 56	2,293 56
	Blenheim, Township	4					4			2		480 00	220 80	220 80
	Transferred from previous year											278 06		
	Totals	18			2		20			5	18	6,604 06	2,909 96	2,909 96

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Oxford.	Ingersoll, Town	7	.....	.....	1	.....	8	.....	.....	3	13	2,826 00	1,130 40	1,130 40
	Tillsonburg, Town	3	.....	.....	1	.....	4	1	.....	2	12	1,443 45	577 38	577 38
	*Norwich, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Norwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*South Norwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dereham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*East Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	10	.....	.....	2	.....	12	1	.....	5	25	4,269 45	1,707 78	1,707 78
Parry Sound East	Nipissing	1	.....	.....	.....	.....	1	.....	.....	1	1	122 00	45 75	45 75
	Chapman	1	.....	.....	.....	.....	1	.....	.....	.....	1	122 00	45 75	45 75
	Himsworth, North	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	90 00	90 00
	Perry	3	.....	.....	.....	.....	3	.....	.....	1	7	374 00	140 25	140 25
	Machar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sundridge, Village	1	.....	.....	.....	.....	1	.....	.....	.....	1	252 00	94 50	94 50
	Burk's Falls, Village	2	.....	1	.....	.....	3	.....	.....	1	4	633 00	237 38	237 37
	Himsworth, South	2	.....	.....	.....	.....	2	.....	.....	.....	2	244 00	91 50	91 50
	McMurrich	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Powassan, Town	2	.....	.....	.....	.....	2	.....	.....	.....	4	508 00	190 50	190 50
	South River, Village	1	.....	.....	.....	.....	1	.....	.....	.....	2	254 00	95 25	95 25
	Kearney, Town	2	.....	.....	.....	.....	2	.....	.....	.....	2	504 00	189 00	189 00
	†Unorganized Territory	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	.....	112 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	339 32	.....	.....
	Totals	19	.....	1	.....	.....	20	.....	.....	3	24	3,832 22	1,264 88	1,377 37

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c
Parry Sound West	McKellar	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....
	Christie	2	.....	.....	.....	.....	2	.....	.....	2	.....	300 00	100 00	100 00
	Parry Sound, Town	2	.....	.....	1	.....	3	.....	.....	1	7	2,414 00	804 67	804 67
	Foley	1	.....	.....	.....	.....	1	.....	.....	1	.....	200 00	66 66	66 67
	Humphrey	1	‡1	1	.....	.....	3	.....	.....	.....	1	227 00	75 67	75 67
	Hagerman	1	.....	.....	.....	.....	1	.....	.....	.....	1	122 00	40 66	40 67
	*McDougall	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	6	.....	1	.....	.....	7	.....	.....	.....	1	782 00	.....	521 33
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	13	1	2	1	.....	17	.....	.....	4	10	4,045 00	1,087 67	1,609 01
Peel	Brampton, Town	4	.....	.....	.....	.....	4	.....	.....	.....	6	1,412 00	529 50	529 50
	*Chinguacousy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Toronto, Township	5	.....	.....	.....	.....	5	.....	.....	1	.....	600 00	225 00	225 00
	Toronto, Gore	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Streetsville, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	187 50	187 50
	Caledon	3	.....	.....	.....	.....	3	.....	.....	.....	.....	600 00	225 00	225 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	156 69	.....	.....
	Totals	17	.....	.....	.....	.....	17	.....	.....	1	6	3,388 69	1,212 00	1,212 00

* Local Option. † Payable to Province, less expenses. ‡ 6 months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Perth..	Mornington	8	.....	.....	.....	.....	8	.....	.....	1	.....	960 00	458 40	458 40
	Ellice	4	.....	.....	.....	.....	4	.....	.....	1	.....	480 00	229 20	229 20
	Wallace	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	57 30	57 30
	Elma	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	171 90	171 90
	Listowel, Town	4	.....	.....	1	.....	5	.....	.....	1	4	1,758 00	839 42	839 41
	Stratford, City	16	.....	.....	2	.....	18	.....	.....	2	22	9,044 00	4,318 42	4,318 42
	North Easthope	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	114 60	114 60
	Milverton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	238 75	238 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	383 17	.....	.....
	Totals	40	.....	.....	3	.....	43	.....	.....	7	26	13,845 17	6,427 99	6,427 98
South Perth..	South Easthope	6	.....	.....	1	.....	7	.....	.....	.....	.....	920 00	402 50	402 50
	*Fullarton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mitchell, Town	4	.....	....	1	....	5	.....	.....	.....	3	1,276 00	558 25	558 25
	Hibbert	2	.....	.....	1	....	3	.....	.....	.....	.....	440 00	192 50	192 50
	Downie	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	157 50	157 50
	St. Mary's, Town	6	.....	.....	2	.....	8	.....	.....	.....	11	2,822 00	1,234 63	1,234 62
	Blanshard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Logan	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	212 52	.....	.....
	Totals	22	.....	.....	5	.....	27	.....	.....	.....	14	6,150 52	3,597 88	2,597 87

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Peterborough	*Asphodel													
	*Dummer													
	*Otonabee													
	Burleigh and Anstruther	2					2					240 00	96 00	96 00
	*Norwood, Village													
	Belmont and Methuen													
	Havelock, Village	3					3					2,250 00	900 00	900 00
	Chandos													
	Transferred from previous year													
	Totals	5					5					2,490 00	996 00	996 00
West Peterborough	*Smith													
	*Lakefield, Village													
	Peterborough, City	19			4	1	24			4	49	11,648 00	5,241 60	5,241 60
	North Monaghan													
	Ennismore													
	Harvey													
	Transferred from previous year											130 99		
	Totals	19			4	1	24			4	49	11,778 99	5,241 60	5,241 60

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Port Arthur..	Neebing	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Arthur, Town	15	.....	.....	2	1	18	.....	.....	5	63	8,676 00	4,083 44	4,083 44
	*Schreiber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	2	.....	.....	1	.....	3	1	.....	.....	.....	770 00	.....	731 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	270 09	.....	.....
	Totals	17	.....	.....	3	1	21	1	.....	5	63	9,716 09	4,083 44	4,814 94
Prescott	South Plantagenet	7	.....	.....	.....	.....	7	.....	.....	.....	.....	840 00	378 00	378 00
	East Hawkesbury	6	1-11	mos.	.....	.....	6	.....	.....	1	.....	710 00	319 50	319 50
	Longeuil	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	54 00	54 00
	North Plantagenet	9	.....	.....	.....	.....	9	.....	.....	1	.....	1,080 00	486 00	486 00
	Caledonia	3	.....	1	.....	.....	4	.....	.....	3	.....	420 00	189 00	189 00
	Alfred	6	.....	.....	.....	.....	6	.....	.....	3	.....	720 00	324 00	324 00
	*West Hawkesbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hawkesbury, Town	8	.....	.....	2	.....	10	.....	.....	4	2	3,504 00	1,576 80	1,576 80
	L'Original, Village	3	.....	1	.....	.....	4	.....	.....	.....	.....	875 00	393 75	393 75
	Vankleek, Town	4	.....	.....	1	.....	5	.....	.....	.....	3	1,276 00	574 20	574 20
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13 09	.....	.....
	Totals	47	.....	2	3	.....	52	.....	.....	12	5	9,558 09	4,295 25	4,295 25

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Prince Edward	Picton, Town	6			1		7				20	2,490 00	1,037 50	1,037 50
	*South Marysburg													
	Wellington, Village	2					2					500 00	208 33	208 33
	*Sophiasburg													
	Hillier	1					1					120 00	50 00	50 00
	*Ameliasburg													
	*Hallowell													
	North Marysburg													
	Transferred from previous year											257 34		
	Totals	9			1		10				20	3,367 34	1,295 83	1,295 83
Rainy River..	Emo	2					2					300 00	120 00	120 00
	McIrvine													
	Chappell	1					1					120 00	48 00	48 00
	Atwood													
	Fort Frances, Town	4			1		5				12	1,604 00	641 60	641 60
	Rainy River, Town	3			1		4	1		2	8	1,393 50	557 40	557 40
	Morley	1					1				1	202 00	80 80	80 80
	Lavallee	3					3			1		360 00	144 00	144 00
	Dilke	2					2				2	404 00	161 60	161 60
	Delhi													
	†Unorganized Districts	2					2				1	242 00		193 60
	Transferred from previous year													
	Totals	18			2		20	1		3	24	4,625 50	1,753 40	1,947 00

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Renfrew	Bromley	3	.....	.....	.....	.....	3	.....	.....	1	....	360 00	150 00	150 00
	Pembroke, Town	9	.....	1	3	.....	13	.....	.....	3	20	5,665 00	2,360 42	2,360 42
	Ross	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Westmeath	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	150 00	150 00
	Wilberforce, etc.	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 00	50 00
	Petawawa	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	100 00	100 00
	Rolph, Buchanan and Wylie...	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	50 00	50 00
	Cobden, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	208 34	208 33
	Transferred from previous year..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	21	.....	1	3	.....	25	.....	....	6	20	7,365 00	3,068 76	6,068 75
South Renfrew	Eganville, Village	3	.....	.....	2	.....	5	.....	.....	.....	.....	1,290 00	580 50	580 50
	*McNab	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Renfrew, Town	6	.....	.....	2	.....	8	.....	.....	.....	12	2,824 00	1,270 80	1,270 80
	Grattan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Brougham	2	.....	.....	.....	.....	2	.....	.....	3	.....	240 00	108 00	108 00
	Brudenell and Lyndock	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	108 00	108 00
	Arnprior, Town	6	.....	1	2	.....	9	.....	.....	2	7	2,989 00	1,345 05	1,345 05
	Radcliffe and Raglan	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	108 00	108 00
	Griffith and Matawachan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bagot and Blithfield	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	162 00	162 00
	Admaston	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	54 00	54 00
	Jones	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hagarty, etc.	6	.....	.....	.....	.....	6	.....	.....	1	.....	720 00	324 00	324 00
	Sebastopol	.....	1 (6	mos.)	.....	.....	1	.....	.....	.....	.....	45 00	20 25	20 25
	Horton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	135 76	.....	.....
	Totals	31	1	1	6	.....	39	.....	.....	6	19	9,203 76	4,080 60	4,080 60

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Russell	Cambridge	2					2					240 00	98 00	98 00
	Russell	6					6			2		900 00	367 50	367 50
	Clarence	6					6			1		720 00	294 50	294 50
	Gloucester	6					6	1		1		812 50	332 04	332 04
	Cumberland	4					4			1		480 00	196 00	196 00
	*Osgoode													
	Rockland Town	4					4				2	1,404 00	573 33	573 34
	Casselman, Village	2					2			1		500 00	204 17	204 17
	Transferred from previous year											202 56		
	Totals	30					30	1		6	2	5,259 06	2,065 54	2,065 55
Sault Ste. Marie	Sault Ste. Marie	13		1		1	15			3	50	6,225 00	2,637 45	2,637 45
	*Korah													
	†Unorganized Districts	1		1			2					180 00		150 00
	Transferred from previous year											190 47		
	Totals	14		2		1	17			3	50	6,595 47	2,637 45	2,787 45
St. Catharines	St. Catharines, City	19			2	1	22			3	30	10,610 00	5,140 40	5,140 40
	Transferred from previous year											539 81		
	Totals	19			2	1	22			3	30	11,149 81	5,140 40	5,140 40

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Simcoe.	Barrie, Town	11	.....	.....	1	.....	12	.....	.....	4	24	5,448 00	2,508 25	2,508 25
	Sunnidale	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	109 50	109 50
	Flos	4	.....	.....	.....	.....	4	.....	.....	1	.....	600 00	277 50	277 50
	Tiny	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	55 50	55 50
	Vespra	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	387 58	.....	.....
	Totals	18	.....	.....	1	.....	19	.....	.....	7	24	6,795 58	2,950 75	2,950 75
East Simcoe..	Orillia, Township	1	.....	.....	.....	.....	1	.....	.....	1	1	122 00	30 50	30 50
	*Oro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tay	2	.....	.....	.....	.....	2	.....	.....	1	1	242 00	65 10	65 10
	*Medonte	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Penetanguishene, Town	4	.....	1	1	.....	5	.....	.....	1	9	1,884 67	519 60	519 59
	Orillia, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	4 00	.....	.....
	*Midland, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	7	.....	1	1	.....	8	....	.....	3	13	2,254 67	615 20	615 19

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Simcoe.	Adjala	2					2					240 00	87 00	87 00
	Bradford, Village	2					2					500 00	181 25	181 25
	*Tecumseth													
	*Bolton, Village													
	Albion	3					3					360 00	129 00	129 00
	*Innisfil													
	*West Gwillimbury													
	Beeton, Village	3					3					750 00	271 88	271 87
	Tottenham, Village	2					2			1		500 00	181 25	181 25
	Transferred from previous year											117 94		
	Totals	12					12			1		2,467 94	850 38	850 37
West Simcoe.	Essa	4					4					480 00	212 62	212 63
	*Nottawasaga													
	Stayner, Town	3			1		4				1	1,022 00	453 53	453 52
	Collingwood, Town	7			2		9			1	14	4,078 00	1,811 09	1,811 10
	Tossorontio	3					3					360 00	159 75	159 75
	Alliston, Town	3			1		4					1,478 00	658 37	658 36
	*Creemore, Village										4			
	Transferred from previous year											324 64		
	Totals	20			4		24			1	19	7,742 64	3,295 36	3,295 36

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Stormont	Cornwall, Town	11	.....	.....	2	.....	13	.....	.....	2	18	5,886 00	2,575 13	2,575 13
	Cornwall, Township	6	.....	.....	.....	.....	6	.....	.....	1	....	720 00	315 00	315 00
	*Osnabruck	.....	.....	.....	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Finch	4	.....	.....	.....	.....	4	.....	.....	3	.....	600 00	262 51	262 49
	Roxborough	4	.....	.....	.....	....	4	.....	.....	1	.....	640 00	280 00	280 00
	Finch, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	109 36	109 38
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10 70	.....	.....
	Totals	26	.....	.....	2	.....	28	.....	.....	7	18	8,106 70	3,542 00	3,542 00
Sturgeon Falls	Springer	1	.....	.....	.....	.....	1	.....	.....	.....	2	169 00	73 94	73 94
	Caldwell	2	.....	.....	.....	.....	2	.....	.....	.....	2	334 00	146 13	146 12
	Dunnett and Rutter	3	.....	.....	1	.....	4	.....	.....	3	2	924 00	404 26	404 24
	Sturgeon Falls, Town	4	.....	.....	2	.....	6	.....	.....	3	5	2,410 00	1,054 38	1,054 37
	Martland	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	†Unorganized Territory	2	(1 for 9 mos.)	.....	.....	.....	2	....	.....	1	.....	210 00	.....	182 75
	Transferred from previous year	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	258 81	.....	.....
	Totals	13	....	.....	3	.....	16	.....	.....	7	11	4,425 81	1,731 21	1,914 92

*Local Option. †Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Sudbury	Balfour	2					2			1	2	284 00	118 40	118 40
	Blezard	1					1				1	122 00	52 90	52 90
	Chapleau	2					2				10	400 00	173 13	173 14
	Drury, Denison and Graham	3					3			2	2	574 00	242 34	242 34
	Hagar	2					2					240 00	102 00	102 00
	Hanmer	1					1				1	122 00	52 90	52 90
	Rayside	1					1					120 00	50 00	50 00
	Sudbury	6			2		8			1	25	3,150 00	1,352 70	1,352 70
	†Unorganized Territory	3					3			1	4	368 00		310 66
	Totals	21			2		23			5	45	5,380 00	2,144 37	2,455 04
Temiscaming	New Liskeard, Town	3			1		4			3	10	1,330 00	266 00	266 00
	Haileybury, Town	4				2	6				15	2,130 00	426 00	426 00
	Cobalt, Town													
	Latchford, Town	1					1				4	258 00	51 60	51 60
	Evanturel													
	Coleman													
	Dymond													
	Bucke													
	*Harley													
	†Unorganized Territory	2					2				1	242 00		96 80
	Transferred from previous year													
	Totals	10			1	2	13			3	30	3,960 00	743 60	840 40
Toronto	Toronto, City	144	‡1		50	14	209			17	562	225,074 00	107,939 00	107,939 00
	Transferred from previous year													
	Totals	144	‡1		50	14	209			17	562	225,074 00	107,939 00	107,939 00

*Local Option. †Payable to Province, less expenses. ‡ Six months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Victoria.	*Omemee, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fenelon Falls, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	250 00	250 00
	*Fenelon, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bobcaygeon, Village	2	.....	.....	.....	.....	2	....	.....	.....	.....	500 00	166 67	166 67
	*Somerville	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bexley	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	80 00	80 00
	Digby	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	.....
	Emily	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 81	.....	.....
	Totals	7	.....	.....	.....	.....	7	.....	.. ..	.....	.....	1,497 81	496 67	496 67
West Victoria.	Lindsay, Town	8	.....	.....	1	.....	9	.....	....	3	16	4,082 00	1,632 80	1,632 80
	*Woodville, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Eldon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Mariposa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185 59	.....	.....
	Totals	8	.....	.....	1	.....	9	.....	.....	3	16	4,267 59	1,632 80	1,632 80

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Waterloo	Waterloo Tp., N. Part	5					5					600 00	279 00	279 00
	Woolwich	5			1		6			1		800 00	372 00	372 00
	Wellesley	13			1		14			1		1,760 00	818 40	818 40
	Berlin, Town	9			2		11			2	14	5,528 00	2,570 52	2,570 52
	Waterloo, Town	7			1		8				7	2,814 00	1,308 51	1,308 51
	Elmira, Village	3			1		4			2		1,020 00	474 30	474 30
	Transferred from previous year													
	Totals	42			6		48			6	21	12,522 00	5,822 73	5,822 73
South Waterloo	Galt, Town	7			2		9			1	18	4,086 00	1,940 85	1,940 85
	Preston, Town	5			1		6			2	5	2,110 00	1,002 25	1,002 25
	Wilmot	10					10					1,200 00	570 00	570 00
	Waterloo Tp., S. Part	4					4					480 00	228 00	228 00
	Hespeler, Town	2					2			2	5	710 00	337 25	337 25
	*North Dumfries					1	1					50 00	23 75	23 75
	New Hamburg, Village	4			1		4					1,270 00	603 25	603 25
	Ayr, Village	2					2					500 00	237 50	237 50
	Transferred from previous year											592 24		
	Totals	34			4	1	38			5	28	10,998 24	4,942 85	4,942 85

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Welland	Niagara Falls, City	18			4		22			4	34	9,968 00	4,734 81	4,734 79
	Crowland	1					1					120 00	57 00	57 00
	Chippewa, Village	2			1		3			1		770 00	365 75	365 75
	Fort Erie, Village	3		1	1		5			2		1,145 00	543 88	543 87
	Port Colborne, Village	3		1	1		5					1,145 00	543 87	543 88
	Humberstone	8		1			9			1		1,020 00	484 50	484 50
	Stamford	3					3					360 00	171 00	171 00
	Thorold, Township	4					4					480 00	228 00	228 00
	Thorold, Town	3			1		4			1	10	1,420 00	674 50	674 50
	Welland, Town	6			2		8			1	14	2,828 00	1,343 31	1,343 29
	Willoughby	2		1			3					300 00	142 50	142 50
	Bertie	7					7					875 00	415 62	415 63
	Bridgeburg, Village	3		1			4			1		875 00	415 63	415 62
	Transferred from previous year											787 61		
	Totals	63		5	10		78			11	58	22,093 61	10,120 37	10,120 33
East Wellington	Mount Forest, Town	5					5			1	9	1,768 00	707 20	707 20
	Elora, Village	3					3					750 00	300 00	300 00
	Nichol	1					1					120 00	48 00	48 00
	Fergus, Village	3					3					750 00	300 00	300 00
	*West Garafraxa													
	*Erin Township													
	Arthur, Township	1					1					120 00	48 00	48 00
	West Luther	1					1					120 00	48 00	48 00
	Erin, Village	2					2					500 00	200 00	200 00
	Transferred from previous year													
	Totals	16					16			1	9	4,128 00	1,651 20	1,651 20

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Wellington ..	Pilkington	1					1					120 00	55 50	55 50
	Eramosa	3					3					360 00	166 50	166 50
	Guelph, Township	1					1					120 00	55 50	55 50
	Puslinch	2					2			1		240 00	111 00	111 00
	Guelph, City	15			2	1	18			5	44	8,638 00	3,994 30	3,994 30
	Transferred from previous year											378 55		
	Totals	22			2	1	25			6	44	9,856 55	4,382 80	4,382 80
West Wellington ..	Clifford, Village	2					2					500 00	215 62	215 63
	Arthur, Village	3					3					750 00	318 75	318 75
	Harriston, Town	4					4			1	5	1,090 00	463 00	463 00
	Drayton, Village	3					3			1		750 00	318 75	318 75
	Palmerston, Town	4					4			1	6	1,092 00	457 65	457 65
	*Maryborough													
	Minto													
	*Peel													
	Transferred from previous year											52 20		
	Totals	16					16			3	11	4,234 20	1,773 77	1,773 78

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Wentworth ..	Dundas	5	1	.....	1	.....	7	.....	.....	2	8	2,378 50	951 40	951 40
	*Beverley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Flamborough	2	.....	.....	.....	.....	2	2	.....	.....	.....	300 00	120 00	120 00
	East Flamborough	2	.....	.....	.....	.....	2	.....	.....	.....	.....	270 00	108 00	108 00
	Waterdown, Village	2	.....	.....	.....	.....	2	.....	.....	2	.....	500 00	200 00	200 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	229 30	.....	.....
	Totals	11	1	.....	1	.....	13	2	.....	4	8	3,677 80	1,379 40	1,379 40
South Wentworth ..	*Binbrook	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ancaster	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....
	Saltfleet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Barton	5	.....	.....	.....	1	6	.....	.....	1	.....	650 00	162 50	162 50
	Glanford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	60 00	60 00
	Burlington Beach	3	.....	.....	.....	1	4	.....	.....	1	.....	410 00	102 50	102 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	10	.....	.....	..	2	12	.....	.....	2	.....	1,300 00	325 00	325 00
†Windsor	City of Windsor	23	.....	.....	3	.....	26	.....	.....	4	42	13,084 00	6,018 64	6,018 64
	Sandwich	8	.....	.....	1	.....	9	.....	.....	4	5	3,160 00	1,453 60	1,453 60
	Walkerville	3	.....	.....	2	.....	5	.....	.....	.....	5	1,760 00	809 60	809 60
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	194 60	.....	.....
	Totals	34	.....	.....	6	.....	40	.....	.....	8	52	18,198 60	8,281 84	8,281 84

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East York....	Scarborough	4				2	6					700 00	280 00	280 00
	*Markham, Township													
	York, east of Yonge St.	7				2	9			1		940 00	376 00	376 00
	Markham, Village	2					2					500 00	200 00	200 00
	*Richmond Hill, Village													
	East Toronto, Town	5					5			1	9	1,768 00	707 20	707 20
	Transferred from previous year											37 19		
	Totals	18				4	22			2	9	3,945 19	1,563 20	1,563 20
North York...	Aurora, Town	3					3				2	754 00	322 57	322 57
	Holland Landing, Village	1					1					250 00	108 34	108 33
	North Gwillimbury	2					2					240 00	105 00	105 00
	King	5	(18	mos.			5					606 67	262 17	262 16
	East Gwillimbury	3					3			1		360 00	154 00	154 00
	*Whitchurch													
	Newmarket, Town	3			1		4				10	1,420 00	615 20	615 20
	Georgina	1					1					120 00	52 00	52 00
	*Stouffville, Village													
	Sutton, Village	2	(16	mos.)			3					593 75	255 73	255 73
	Transferred from previous year											311 06		
	Totals	20	1		1		22			1	12	4,655 48	1,875 01	1,874 99

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Concluded.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extension.		Transfers.	Bartenders.	Amount received for license in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West York....	York, west of Yonge St.	5	.....	.....	.....	.....	5	.....	.....	1	.....	600 00	137 00	137 00
	*Vaughan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Etobicoke	6	.....	.....	.....	.....	6	.....	.....	1	.....	720 00	166 50	166 50
	Woodbridge, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	115 63	115 62
	*Weston, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Toronto Junction	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Toronto, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23 28	.....	.....
	Totals	13	.....	.....	.....	.....	13	.....	.....	3	.....	1,843 28	419 13	419 13
	Grand Total	2,002	†12	44	253	42	2,353	32	7	332	2,046	923,203 23	406,201 12	409,654 19

*Local Option. † 4 for 6 months.

SCHEDULE B.—ADDENDA.

Showing amounts collected under Municipal By-Laws for tavern and shop licenses in excess of Statutory Duties.

License District.	Municipality.	Number of Licenses.	Amount of Excess.
Bruce, North	Albemarle	1	$ 15 00
Brockville	Brockville Town	11	1,120 00
Dufferin	Shelburne	3	450 00
Dundas	Iroquois	2	20 00
	Chesterville	3	30 00
Elgin, East	Port Stanley	2½	25 00
Elgin, West	Aldboro'	1	10 00
	Dutton	2	20 00
Essex, North	Tilbury, N.	2	20 00
Essex, South	Essex	3	60 00
	Tilbury W.	3	165 00
Fort William	Paipoose	1	80 00
Glengarry	Charlottenburg	4½	360 00
	Lancaster	2	10 00
	Kenyon	4	20 00
	Lochiel	2	60 00
Halton	Nelson	1	40 00
Hastings, East	Hungerford	2	10 00
Hastings, North	Madoc	2	20 00
Kent, East	Blenheim	3	60 00
	Dresden	2	40 00
	Harwich	2	10 00
Lambton, East	Brooke	1	30 00
	Plympton	1	40 00
Middlesex, North	Biddulph	3	45 00
Middlesex, West	Glencoe	3	30 00
Nipissing	Mattawa	4	80 00
Northumberland, East	Percy	2	60 00
Ontario, South	Oshawa	4	80 00
	Whitby Tp.	2	20 00
	Whitby, E.	2	20 00
Parry Sound, West	Christie	2	60 00
	Parry Sound	3	1,350 00
	Foley	1	80 00
Peterborough, East	Havelock	3	1,500 00
Rainy River	Emo	2	60 00
	Chappell	4	80 00
	Rainy River	3	65 00
	Morley	1	80 00
	Dilke	2	160 00
Russell	Gloucester	6	62 50
Simcoe, Centre	Flos	4	120 00
Simcoe, West	Alliston	3	450 00
Stormont	Finch	4	120 00
	Roxboro'	4	160 00
Sturgeon Falls	Springer	1	45 00
	Caldwell	2	90 00
Sudbury	Balfour	2	40 00
	Chapleau	2	140 00
	Drury, D. & G.	3	210 00
Temiskaming	New Liskeard	3	60 00

SCHEDULE C.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1908-9.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Addington	30 00	243 34
Algoma	450 00	540 01
Brant, North	.....	.....
Brant South	110 00	80 00
Brantford, City	20 00	166 67
Brockville	200 00	270 00
Bruce, Centre	50 00	349 99
Bruce, North	165 00	206 68
Bruce, South	340 00	196 66
Carleton	220 00	.. ..
Dufferin	162 00	116 66
Dundas	225 00	.....
Durham, East	270 00	246 68
Durham, West	.....	200 01
Elgin, East	239 00	246 67
Elgin, West	.....	.....
Essex, North	300 00	630 00
Essex, South	501 00	538 34
Fort William	515 00	333 34
Frontenac	375 00	.....
Glengarry	530 00	441 12
Grenville	130 00	83 34
Grey, Centre	40 00	40 00
Grey, North	45 00	.....
Grey, South	70 00	40 00
Haldimand	160 00	413 36
Haliburton	.....	40 00
Halton	.....	246 67
Hamilton	1,450 00	2,333 38
Hastings, East	120 00	.....
Hastings, North	60 00	330 01
Hastings, West	250 00	640 00
Huron, East	50 00	40 00
Huron, South	330 00	323 34
Huron, West	200 00	466 65
Kenora, East	420 00	.....
Kenora, West	615 00	.....
Kent, East	310 00	206 67
Kent, West	775 00	533 34
Kingston	1,260 00	333 34
Lambton, East	305 00	166 68
Lambton, West	485 00	275 01
Lanark, North	130 00	156 67
Lanark South	205 00	300 00
Leeds	109 00	83 34

SCHEDULE C.—Continued.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1908-9.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Lennox	.....	.....
Lincoln	.....	.....
London	710 00	933 35
Manitoulin	.....	246 66
Middlesex, East	.....	360 00
Middlesex, North	110 00	168 34
Middlesex, West	60 00	170 00
Monck	70 00	116 67
Muskoka	245 00	429 98
Nipissing	.....	90 00
Norfolk, North	.....	316 67
Norfolk, South	50 00	83 34
Northumberland, East	150 00	117 00
Northumberland, West	.....	593 34
Ontario, North	30 00	196 68
Ontario, South	.....	.....
Ottawa	305 00	3,266 69
Oxford, North	110 00	396 67
Oxford, South	145 00	583 35
Parry Sound, East	160 00	163 34
Parry Sound, West	440 00	413 34
Peel	10 00	40 00
Perth, North	265 00	609 99
Perth, South	339 00	.....
Peterborough, East	20 00	.....
Peterborough, West	180 00	666 68
Port Arthur	470 00	833 35
Prescott	1,253 00	786 64
Prince Edward	60 00	.....
Rainy River	150 00	220 00
Renfrew, North	127 00	613 33
Renfrew, South	475 00	393 34
Russell	200 00	306 68
Sault Ste. Marie	265 00	450 00
St. Catharines	200 00	500 01
Simcoe, Centre	165 00	730 00
Simcoe, East	177 30	196 66
Simcoe, South	50 00	83 34
Simcoe, West	90 00	150 00
Stormont	370 00	543 34
Sturgeon Falls	20 00	296 67
Sudbury	.....	379 97
Temiskaming	8,488 10	270 00
Toronto	2,400 00	6,400 04
Victoria, East	34 85	.....
Victoria West	105 00	450 00

SCHEDULE C.—Concluded.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1908-9.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Waterloo, North	175 00	586 66
Waterloo, South	530 00	700 02
Welland	950 00	1,131 70
Wellington, East	185 00	116 65
Wellington, South	335 00	873 32
Wellington, West	120 00	263 34
Wentworth, North	.....	400 01
Wentworth, South	.....	80 00
Windsor	1,190 00	1,133 36
York, East	.....	156 67
York, North	35 00	40 00
York, West	90 0	163 34
Totals	34,330 25	41,068 50

SCHEDULE D.

STATEMENT, showing the amounts paid for expenses of Commissioners, salaries of Inspectors, office rent, postage, stationery, printing, advertising and legal expenses for the license year 1908-9, in each license district.

Addington	$921 83
Algoma	1,050 33
Brant, North	582 00
Brant South	315 99
Brantford	859 10
Brockville	447 73
Bruce Centre	709 84
Bruce North	1,102 83
Bruce, South	755 11
Carleton	676 76
Dufferin	872 09
Dundas	719 42
Durham, East	661 69
Durham, West	504 99
Elgin, East	660 59
Elgin, West	1,110 38
Essex, North	1,229 68
Essex, South	942 08
Fort William	622 75
Frontenac	564 33
Glengarry	969 24
Grenville	618 17
Grey, Centre	740 80
Grey, North	1,066 61
Grey, South	677 22
Haldimand	657 10
Haliburton	280 80
Halton	768 32
Hamilton	2,054 38
Hastings, East	986 36
Hastings, North	1,125 89
Hastings, West	1,331 30
Huron, East	714 69
Huron, South	715 84
Huron, West	937 35
Kenora, East	310 13
Kenora, West	918 58
Kent, East	1,006 95
Kent, West	877 05
Kingston	1,226 94
Lambton, East	664 88
Lambton, West	800 30
Lanark, North	892 06
Lanark, South	881 26
Leeds	662 19
Lennox	625 06
Lincoln	545 83
London	1,813 62
Manitoulin	873 31
Middlesex, East	896 40
Middlesex, North	1,207 02
Middlesex, West	700 82
Monck	534 38
Muskoka	907 87

SCHEDULE D.—Concluded.

Statement, etc.—*Concluded.*

Nipissing	931 28
Norfolk, North	537 15
Norfolk, South	580 17
Northumberland, East	686 62
Northumberland, West	705 43
Ontario, North	900 22
Ontario, South	716 00
Ottawa	2,640 44
Oxford, North	761 75
Oxford, South	912 38
Parry Sound, East	1,031 86
Parry Sound, West	1,098 88
Peel	672 81
Perth, North	1,040 06
Perth, South	721 05
Peterborough, East	559 44
Peterborough, West	1,114 89
Port Arthur	714 45
Prescott	1,123 24
Prince Edward	759 93
Rainy River	717 75
Renfrew, North	1,252 11
Renfrew, South	1,096 85
Russell	984 53
Sault Ste. Marie	977 75
St. Catharines, City	730 45
Simcoe, Centre	910 10
Simcoe, East	1,075 73
Simcoe, South	777 82
Simcoe, West	1,062 95
Stormont	1,374 95
Sturgeon Falls	690 24
Sudbury	858 69
Temiskaming	2,540 55
Toronto	8,399 64
Victoria, East	520 29
Victoria, West	884 27
Waterloo, North	920 67
Waterloo, South	803 26
Welland	1,300 88
Wellington, East	801 67
Wellington, South	1,085 94
Wellington, West	770 79
Wentworth, North	895 46
Wentworth, South	594 32
Windsor	1,391 39
York, East	742 65
York, North	709 84
York, West	1,049 50
Total	$99,428 33

RECAPITULATION

OF

RECEIPTS AND EXPENDITURES

1908-9.

Total Receipts for Licenses, Schedule "B"	$923,203 23	
" " " Fines, " "C"	34,330 25	
" " " Transfers, " "C"	41,068 50	
		$998,601 98
Paid to Municipalities, Schedule "B"	$406,201 12	
" Province, " "	409,654 19	
" " " "C"	75,398 75	
" for Inspectors' Salaries, Commissioners and Office Expenses, Schedule "D"	99,428 33	
Balances transferred to 1909-10	7,919 59	
		998,601 98

SCHEDULE E.—Giving names and addresses of holders of Distiller's, Brewer's, Brewer's Warehouses and Wholesale licenses for 1908-9.

Distillers.

Corby, H., Distilling Co., Limited, Belleville.
General Distillery Co., Limited, Toronto.
Gooderham & Worts, Limited, Toronto.
Hamilton Distillery Co., Hamilton.
Maclaren, John A., Estate of, Perth.
Spalding & Stewart, Perth.
Seagram, Joseph E., Waterloo.
Walker & Sons Co., The Hiram, Limited, Walkerville.
Wiser & Sons, The Jos., Limited, Prescott.

Brewers.

Anderton & Co., Barrie.
Andrich, E. C. & Bro., Salem.
Barrie Brewing Co., Barrie.
Bauer, A. (Kuntz & Co.), Waterloo.
Bernhardt, P., Preston.
Bixell Brewing and Malting Co., Brantford
Bowie & Co., Brockville.
Brading Brewing Co., Limited, Ottawa.
British American Brewing Co., Limited, Windsor.
Calcutt Brewing and Malting Co., Limited, Peterborough.
Carling Brewing and Malting Co., Limited, London.
Capital Brewing Co., Limited, Ottawa.
Copland Brewing Co., Limited, Toronto.
Cosgrave Brewing Co., Limited, Toronto.
Cornell Brewing and Malting Co., Limited, Lindsay.
Cronmiller & White, Brewing and Malting Co., Limited, Port Colborne.
Devlin, Felix, Stratford.
Dominion Brewing Co., Limited, Toronto.
Edgmondville Brewing Co., Edgmondville.
Farquarson & Granger, Limited, Walkerton.
Fisher, John, Portsmouth.
Grant Spring Brewing Co., Limited, Hamilton.
Hamilton, Joseph, London.
Heisz, Lawrence, Formosa.
Holliday, W. R., Guelph.
Heuther, C. N., Berlin.
Heuther, W., Neustadt.
Hamilton Brewing Association, Limited, Hamilton.
Kakabeka Falls Brewing Co., Fort William.
Kemp, D. C., Hornby.
Korman Brewing Co., Limited, Toronto.
Labatt, John, London.
McCarthy, Sons & Co., Limited, Prescott.
New Ontario Brewing Co., Limited, North Bay.
O'Keefe Brewery Co., of Toronto, Limited, Toronto.
Otterbeam, C., Woodstock.
Port Hope Brewing and Malting Co., Limited, Port Hope.
Raw, Mary, New Hamburgh.
Reinhardt & Co., Toronto.
Roy, James A., Belleville.
Rudolph & Begg, St. Thomas.
Schwan, David, Carlsruhe.
Sleeman & Sons, Guelph.
Soo Falls Brewing Co., Limited, Sault Ste. Marie.
Stevenson, Robert, Kingston.
Strathroy Brewing Co., Limited, Strathroy.
Superior Brewing and Malting Co., Limited, Port Arthur.
Schwan, William, Owen Sound.
Sudbury Brewing and Malting Co., Limited, Sudbury.
Taylor & Bates, St. Catharines.
Toronto Brewing & Malting Co., Limited, Toronto.
Union Brewing Co., Limited, Sarnia.
Walkerville Brewing Co., Limited, Walkerville.
Watson, John, Listowel.
Wright, Alfred J., Orillia.

Brewers' Warehouses.

Amherstburg	British American Brewing Co.
Barrie	A. Bauer (Kuntz & Co.)
Belleville	C. N. Heuther.
	Grant Spring Brewing Co.
	Hamilton Brewing Association.
Brockville	Capital Brewing Co., Limited.
	Hamilton Brewing Association.
Collingwood	O'Keefe Brewery Co., of Toronto, Limited.
	Reinhardt & Co.
Cobourg	O'Keefe Brewery Co., of Toronto, Limited.
Chatham	J. Labatt.
	British American Brewing Co.
Fort William	Reinhardt & Co.
	Soo Falls Brewing Co., Limited.
	Superior Brewing Co., Limited.
	Kakabeka Falls Brewing Co.
Guelph	A. Bauer (Kuntz & Co.)
Hamilton	Carling Brewing and Malting Co., of London, Limited.
	Dominion Brewing Co.
	J. Labatt.
Lindsay	A. Bauer (Kuntz & Co.)
Niagara Falls	Reinhardt & Co.
	Taylor & Bates.
Ottawa	Carling Brewing and Malting Co., of London Limited.
	John Labatt.
	O'Keefe Brewery Co., of Toronto, Limited.
Perth	O'Keefe Brewery Co.

SCHEDULE E.—Concluded.

PENETANGUISHENE	A. Bauer (Kuntz & Co.)
PARRY SOUND	do.
PORT ARTHUR	Walkerville Brewing Co., Limited.
	Soo Falls Brewing Co.,
	Kakabeka Falls Brewing Co.
SMITH'S FALLS	O'Keefe Brewery Co.
STRATFORD	A. Bauer (Kuntz & Co.)
	C. N. Heuther.
SUDBURY	Soo Falls Brewery Co., Limited.
	O'Keefe Brewery Co.
	Reinhardt & Co.
	A. Bauer.
SAULT STE. MARIE	Walkerville Brewing Co., Limited.
	Sudbury Brewing Co.
TORONTO	Carling Brewing and Malting Co., of London, Limited.
	John Labatt.
	Sleeman & Sons.
	Hamilton Brewing Association.
TRENTON	C. N. Heuther.
TILLSONBURG	Rudolph & Begg.
WALLACEBURG	British American Brewing Co., Limited.
WIARTON	W. Heuther.
	Rudolph & Begg.

WHOLESALE LICENSES:

BERLIN	Randall & Roos.
HAMILTON	M. G. Lottridge.
	Lucas, Steele & Bristol.
	J. Turner & Co.
LONDON	John Garvey.
NORWICH	S. Allen.
OTTAWA	T. A. Armstrong.
	H. N. Bate & Son.
	Jos. Grant.
	T. H. Morel
	S. J. Major, Limited.
	Douglass & Co.
	Geo. E. Amyot Brewing Co. (6 mos.).
PETERBOROUGH	A. Elliott & Co.
SAULT STE. MARIE	I. Rotchild.
TORONTO	J. H. Calvert.
	Chas. Ciceri (2 mos.).
	Distillers' Agency Co., Limited.
	F. Edwards & Co.
	Geo. J. Foy & Co.
	Wilson S. Howard.
	McGaw & Russell.
	Nichol & McConnel (5 mos.).
	Perkins, Ince & Co.
	D. C. Roblin.
	Peter A. Small (6 mos.)
	J. R. Sangster (6 mos.).

SCHEDULE F.—Showing Statutory Duties payable for tavern, shop and wholesale licenses in the Province of Ontario.

In a city having a population of more than 200,000:

For a tavern license $1,600
For a shop license 1,000

In a city having a population of more than 100,000 and less than 200,000:

For a tavern license $1,200
For a shop license 1,000

In a city having a population of more than 30,000 and not more than 100,000:

For a tavern license $700
For a shop license 700

In a city or town having a population of more than 10,000 and not more than 30,000:

For a tavern license $500
For a shop license 500

In a city having a population of 10,000 or less and in a town having a population of more than 5,000 and not more than 10,000:

For a tavern license $450
For a shop license 450

In a town or incorporated village having a population of more than 2,000 and not more than 5,000:

For a tavern license $350
For a shop license 350

In a town or incorporated village having a population of 2,000 or less:

For a tavern license $250
For a shop license 270

In a township:

For a tavern license $120
For a shop license 200

Provided that in any locality in a Provincial Judicial District other than an incorporated city, town or village there shall be payable:

For a tavern license $120

And provided that in a city, town, village, or other municipality, or a locality without municipal organization in a Provincial Judicial District, there shall be payable:

For a shop license $500

For a beer and wine license a fee of three-fourths of that imposed for a tavern license in the municipality or unorganized district in which the beer and wine license is issued.

For every transfer of a tavern or shop license a fee amounting to one-third of the fee payable for the license transferred.

For each wholesale license elsewhere than in cities $250
In cities having a population of 150,000 and upwards 450
In cities having a population of less than 150,000 and not less than 40,000..... 400
In cities having a population of less than 40,000 350

Provided that the Lieutenant-Governor in Council may increase the duties payable for tavern or shop licenses in any Provincial Judicial District or in any municipality or locality situated therein to such an amount as may be deemed proper, and such increase shall take effect as may be directed by Order-in-Council or from the date of the publication thereof in the *Ontario Gazette*.

SCHEDULE H.

Showing municipalities in which prohibition is in force in 1909.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Addington ...	Kennebec	Tp.	L.O.	1909	308	181	42	139	1	
Algoma	Johnson, Tarbutt, &c.	"	"	1905	296	109	61	48	..	
	MacDonald, Meredith and Aberdeen	"	"	1905	249	101	33	68	..	
	Thessalon	"	"	1906	212	77	28	49	..	
Brant, North..	Onondaga	"	"	1907	361	152	91	61	2	
Bruce, Centre.	Huron	"	"	1907	1,019	529	197	332	2	
Bruce, North.	Amabel	"	"	1906	940	295	219	76	1	Car. '09, mj. 239
	Southampton	Vil.	"	1906	518	233	157	76	2	" " " 48
	Tara	"	"	1906	215	89	76	13	2	" " " 19
	Bruce	Tp.	"	1907	962	300	149	151	1	
	Arran	"	"	1907	761	372	196	176	1	
	Saugeen	"	"	1907	508	232	153	79	1	
Carleton	Goulbourn	"	"	1907	810	353	212	141	2	
	Huntley	"	"	1907	660	286	112	174	2	
	March	"	"	1907	332	145	88	57	2	
Dufferin	Aramanth	"	"	1894	878	215	80	135	1	Car. '09, mj. 236
	E. Garafraxa	"	"	1895	618	201	157	44	1	" 07, " 100
	E. Luther	"	"	1893	639	311	186	125	2	
	Melancthon	"	"	1898	1,145	413	234	179	2	
	Mulmur	"	"	1908	1,020	461	198	263	2	
Dundas	Iroquois	Vil.	"	1909	376	183	94	89	2	
Durham, East	Cavan	Tp.	"	1905	1,015	256	71	185	2	
	Hope	"	"	1906	.....	358	307	51	1	
	Manvers	"	"	1907	1,118	529	213	316	2	
	Millbrook	Vil.	"	1908	327	202	82	120	3	
Durham, West	Clarke	Tp.	"	1905	1,368	641	189	452	2	
	Cartwright	"	"	1904	559	284	111	173	1	
	Darlington	"	"	1900	1,295	438	73	365	1	
	Bowmanville	Town.	"	1909	908	456	233	223	3	
Dundas	Mountain	Tp.	"	1906	411	286	125	161	2	Car. '09, mj. 290
	Winchester	Vil.	"	1907	374	198	83	115	2	
Elgin East ...	Yarmouth	Tp.	"	1905	1,770	663	508	155	4	" '08 " 240
	Malahide	"	"	1909	1,280	662	241	421	..	
Elgin, West ..	Southwold	"	"	1906	1,348	536	315	221	4	
Essex, South.	N. Colchester	"	D.A.	.....	.....	.....	.....	.....	..	
	S. Gosfield	"	L.O.	1907	658	313	173	140	1	B and W.
	Mersea	"	"	1907	1,373	646	319	327	1	
Frontenac ...	Kingston	"	"	1906	1,040	349	301	48	5	
	Storrington	"	"	1892	614	233	195	38	3	
	Portland	"	"	1907	926	433	189	244	3	
	Pittsburgh	"	"	1908	775	275	174	101	3	
Grenville	Cardinal	Vil.	"	1905	314	121	117	7	2	Car. '08, mj. 177
Grey, Centre .	Euphrasia	Tp.	"	1905	1,218	332	276	56	1	
	Artemesia	"	"	1906	1,148	521	212	309	6	
	Collingwood	"	"	1906	1,127	394	313	81	..	" " " 249
	Osprey	"	"	1906	1,003	379	273	106	2	
	Thornbury	Town.	"	1906	278	120	89	31	2	" '09 " 49
Grey, North..	Sarawak	Tp.	D.A.	.....	.....	.....	.....	.....	..	
	Derby	"	L.O.	1906	632	335	80	255	..	
	Keppel	"	"	1906	1,134	441	161	355	2	
	Owen Sound	Town.	"	1906	2,300	1,238	762	438	13	" " " 186
	Sydenham	Tp.	"	1906	1,170	686	238	448	3	
Grey, South ..	Egremont	"	"	1906	995	504	206	298	1	" " " 360
	Proton	"	"	1907	827	456	227	229	3	
	Durham	Town.	"	1908	666	297	179	118	3	

SCHEDULE H.—Continued.

Showing municipalities in which prohibition is in force in 1909.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Haldimand ...	Seneca	Tp.	L.O.	1909	600	317	170	147	2	
Halton	Nassagaweya	"	"	1906	686	330	156	174	1	
	Trafalgar	"	"	1906	1,176	272	174	98	1	
Hastings, East	Tweed	Vil.	"	1909	413	213	124	89	4	
	Thurlow	Tp.	"	1909	1,600	705	443	162	4	
Hastings, N...	Huntingdon	"	"	1906	790	416	149	267	.	Car. '07, mj. 75
	Madoc	"	"	1902	....	432	195	237	2	
	Rawdon	"	"	1902	.....	272	169	103	3	
	Stirling	Vil.	"	1908	283	151	86	65	3	
	Limerick	Tp.	"	1909	117	45	5	40	1	
	Tudor	"	"	1909	252	117	61	56	1	
	Wollaston	"	"	1909	213	128	21	107	1	
Hastings, West	Sidney	"	"	1909	1,633	855	322	533	4	
Huron, East..	Howick	"	"	1908	1,142	523	342	181	4	
Huron, South.	Hensall	Vil.	"	1907	283	140	72	68	2	
	Stanley	Tp.	"	1907	611	288	118	170	2	
	Usborne	"	"	1907	702	352	178	174	1	
Huron, West..	Hullett	"	"	1905	894	357	349	8	2	Car. '08, mj.198
	Wawanosh, E.....	"	"	1906	565	158	88	70	1	
	Ashfield	Tp.	"	1909	1,009	512	266	246	4	
Kent, East ..	Camden	"	"	1905	886	295	252	43	1	Car. '08, mj.116
Kent, West...	Raleigh	"	"	1904	1,645	522	463	59	2	Car. '07, mj.113
	Tilbury, E.....	"	"	1891	889	323	152	171	4	
Lambton, East	Arkona	Vil.	"	1906	170	72	49	23	2	Car. '09, mj. 14
	Euphemia	Tp.	"	1906	650	243	225	17	3	" " " 245
	Warwick	"	"	1906	1,049	471	189	282	..	
	Wyoming	"	"	1909	242	132	65	67	3	
Lambton, West	Dawn	"	"	1905	.....	371	300	71	1	
	Enniskillen	"	"	1906	650	243	226	17	4	
	Moore	"	"	1906	1,483	586	455	131	8	" " " 300
	Sarnia	"	"	1906	749	351	147	204	1	
Lanark, North	Lanark	"	"	1890	449	149	42	107	2	" '07 " 336
	Dalhousie	"	"	1906	508	249	124	125	1	
Lanark, South	S. Sherbrooke	"	"	1907	260	107	59	48	1	
Leeds	Leeds & Lansdowne,	"	"							
	Front	"	"	1900	1,203	411	338	73	1	
Leeds	Athens	Vil.	"	1909	438	264	95	169	2	
	Yonge & Escott, Rear	"	"	1909	438	264	95	169	2	
Lennox	Richmond	"	"	1907	824	401	145	256	1	
Lincoln	Niagara	Tp.	"	1904	734	224	208	16	3	
	Beamsville	Vil.	"	1906	.....	109	103	6	3	" '07 " 31
	Grimsby, N.....	Tp.	"	1906	653	202	101	101	..	" '09 " 39
	" S.....	Tp.	"	1906	518	179	149	30	2	
	" Vil.....	Vil.	"	1906	315	151	122	29	2	
	Clinton	Tp.	"	1906	.....	265	70	195	..	" '09 " 31
Manitoulin ..	Tehkummah	"	"	1900	103	54	22	32	..	
Middlesex, E..	Nissouri, W.	"	"	1907	890	415	203	212	3	
Middlesex, N..	E. Williams	"	"	1905	619	193	168	25	2	
Middlesex, W.	Caradoc	"	"	1909	1,148	605	297	308	3	
Monck	Gainsboro'	"	"	1893	893	385	202	183	2	
	Pelham	"	D.A.	.....	.....	.....	.....	.....	..	" '07 " 332
	Caistor	"	L.O.	1908	571	270	114	156	1	
Muskoka	McLean and Ridout.	"	"	1904	229	74	59	15	2	
	Morrison	"	"	1906	.....	111	35	76	1	
	Port Carling	"	"	1907	130	50	28	22	1	

SCHEDULE H.—Continued.

Showing municipalities in which prohibition is in force in 1909.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Muskoka	Brunel	Tp.	L.O.	1908	150	100	26	74	..	
Nipissing	Dymond	"	"	1907	175	46	20	26	..	
	Jocelyn	"	"	1907	208	61	15	46	..	
Norfolk, North	Windham	Tp.	"	1905	1,221	402	220	182	3	
	Waterford	Vil.	"	1907	367	168	98	70	3	
Norfolk, South	Walsingham, N.	Tp.	"	1907	598	239	90	149	2	
N'mberland, E.	Cramahe	"	"	1907	1,026	525	218	307	1	
	Murray	"	"	1908	1,070	577	196	381	2	
	Seymour	"	"	1908	1,176	521	107	414	1	
	Brighton	Vil.	"	1908	641	316	150	166	2	
	Colborne	"	"	1908	407	206	101	105	3	
	Campbellford	Town.	"	1908	798	372	241	131	4	
N'mb'rland, W.	Haldimand	Tp.	"	1906	1,412	473	386	87	1	
	S. Monaghan	"	"	1906	298	101	6	95	1	
	Hamilton	"	"	1908	1,284	575	273	302	5	
Ontario, North	Scott	"	"	1906	748	251	214	37	2	
Ontario, South	Reach	"	"	1899	1,223	272	174	98	3	
	Pickering	"	"	1906	1,752	694	489	205	5	
Oxford, North.	E. Nissouri	"	"	1906	899	338	311	27	1	
Oxford, South.	E. Oxford	"	"	1905	693	243	194	49	1	
	N. Oxford	"	"	1906	411	177	149	28	2	Car.'09, mj. 132
	Norwich, S.	"	"	1907	825	333	215	118	2	
	Norwich	Vil.	"	1908	408	217	122	95	3	
P'ry Sound, W.	McDougall	Tp.	"	1891	130	30	9	21	..	" '07, " 6
	McKellar	"	"	1908	.....	70	33	37	..	
Peel	Chinguacousy	"	"	1907	1,213	480	308	172	2	
Perth, South..	Fullerton	"	"	1907	701	346	172	174	1	
Peterboro' E...	Dummer	"	"	1906	658	288	126	162	1	
	Otonabee	"	"	1906	1,011	376	181	195	1	
	Asphodel	"	"	1908	584	289	147	142	1	
	Norwood	"	"	1908	299	178	63	115	2	
	Havelock	Vil.	"	1909	485	217	86	131	3	
Peterboro, W..	Smith	Tp.	"	1905	900	429	271	158	4	
	Lakefield	Vil.	"	1906	391	182	141	41	2	" '09, " 61
	Harvey	Tp.	"	1908	389	203	83	120	..	
Port Arthur..	Oliver	Vil.	"	1892	.....	51	11	40	..	
	Schreiber	Tp.	"	1908	162	63	36	27	2	
Prescott	W. Hawkesbury	"	"	1898	350	98	64	34	5	
Prince Edward	Hallowell	"	D.A.	1866	....	.....	.....	.....	..	
	S. Marysburgh	"	L.O.	1897	531	211	77	134	2	
	Ameliasburgh	"	"	1906	953	295	219	76	1	
	Sophiasburgh	"	"	1906	749	253	100	153	1	
	Hillier	"	"	1909	579	320	120	200	1	
	Wellington	Vil.	"	1909	334	170	105	65	2	
Renfrew, S...	McNabb	Tp.	"	1906	970	340	184	156	3	" '09, " 411
	Brougham	"	"	1909	110	47	25	22	2	
Russell	Osgoode	"	"	1906	1,443	597	349	248	5	
S'lt Ste. Marie	Sault Ste. Marie	Town.	"	1891	500	67	52	15	3	Shops only.
	Korah	Tp.	"	1905	750	300	200	100	..	
Simcoe, East..	Oro	"	"	1906	1,099	423	142	281	1	
	Midland	Town.	"	1907	940	477	234	243	5	
	Orillia	"	"	1907	1,302	585	219	316	..	Shops only.
	Medonte	Tp.	"	1908	1,089	544	273	271	6	
Simcoe, South	Bolton	Vil.	"	1906	.....	101	90	11	2	
	Tecumseh	Tp.	"	1907	1,138	474	288	186	2	
	W. Gwillimbury	"	"	1907	786	335	145	190	..	

SCHEDULE H.—Concluded.

Showing municipalities in which prohibition is in force in 1909.—Concluded.

License District.	Municipality.	Status.	Duncan Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Simcoe. South..	Innisfil	Tp.	"	1907	1,238	513	233	280	3	
Simcoe, West.	Nottawasaga	"	"	1902	1,807	635	455	170	2	Car.'09, mj. 352
	Creemore	Vil.	"	1908	228	120	57	63	2	
Stormont	Osnabruck	Tp.	"	1906	1,575	536	434	102	7	" " " 200
Temiskaming.	Harley	"	"	1907	182	29	13	16	..	
Victoria, East.	Fenelon	"	"	1904	.....	231	97	134	2	" " " 345
	Omemee	Vil.	"	1908	192	97	55	42	2	
	Somerville	Tp.	"	1908	553	226	137	89	2	
Victoria, West	Mariposa	"	"	1892	1,399	397	324	73	.	Repeal de-
	Eldon	"	"	1908	861	387	208	179	5	feated 1898
	Woodville.....	Vil.	"	1908	147	75	38	37	1	and 1902.
Waterloo, S...	N. Dumfries	Tp.	"	1907	725	312	160	152	2	
Wellington, E.	W. Garafraxa	"	"	1905	850	302	235	67	2	Carried in '93,
	Erin	"	"	1908	1,120	499	292	207	4	'98 and 1905.
Wellington, W.	Maryborough	"	"	1905	848	453	255	198	3	
	Peel	"	"	1906	1,100	438	314	124	4	
Wentworth, N.	Beverley	"	"	1908	1,265	611	288	323	2	
Wentworth, S.	Binbrook	"	"	1899	408	185	87	98	1	
	Ancaster	"	"	1908	1,235	579	388	221	4	
York, East...	Markham	"	"	1906	1,525	624	430	194	5	Car.'09. mj. 139
	Richmond Hill	Vil.	"	1906	213	99	78	21	..	" " " 191
York, North ..	Whitchurch	Tp.	"	1905	1,225	366	191	175	1	" " " 321
	North Toronto	Town.	"	1906	.....	268	243	25	3	" '08, " 111
	Stouffville	Tp.	"	1906	475	221	122	99	2	" '09, " 80
York, West...	Toronto Junction ...	Town.	"	1904	2,600	869	679	190	7	" '07, " 337
	Weston	Vil.	"	1907	469	227	148	79	3	
	Vaughan	Tp.	"	1906	.....	459	373	86	7	" '09, " 170

SCHEDULE I.

STATEMENT showing number of convictions and dismissals of cases, for infraction of the Liquor License Act, the Dunkin Act and Local Option By-laws, respectively, against licensees and others, during the license year 1908-9.

(NOTE—Where a license district, or a municipality in which prohibition is in force, is omitted, it is to be understood that no prosecutions have taken place therein.)

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Addington	.....	2	.....	3
Algoma	4	.....	9	.....
Brant, South	.....	.....	2	.....
Brantford	1	.....	1	.....
Brockville	1	.....	1	1
Bruce, Centre	2	1	.....	.....
Bruce, North	6	6	9	3
Bruce, South	8	.....	6	2
Carleton	2	.....	2	.....
Dufferin	.....	.....	5	1
Dundas	5	5	6	.....
Durham, East	3	.....	.....	.....
Durham, West	.....	.....	1	.....
Elgin, East	7	2	9	2
Elgin, West	7	2	5	.....
Essex, North	9	8	2	.....
Essex, South	7	3	11	4
Fort William	.....	1	1	2
Frontenac	1	.....	4	.....
Glengarry	11	6	21	7
Grenville	5	1	7	1
Grey, Centre	1	.....	4	3
Grey, North	3	8	4	3
Grey, South	4	.....	2	1
Haldimand	2	.....	1	1
Halton	1	2	6	1
Hamilton	31	6	11	.....
Hastings, East	1	.....	9	1
Hastings, North	5	3	2	3
Hastings, West	9	5	5	5
Huron, East	.....	.....	2	1
Huron, South	11	.....	4	.....
Huron, West	6	.....	2	1
Kenora	5	3	23	3
Kent, East	3	8	14	1
Kent, West	14	5	11	8
Kingston	22	.....	35	2
Lambton, East	5	2	10	1
Lambton, West	3	.....	3	.....
Lanark, North	6	.....	8	1
Lanark, South	6	3	7	3
Leeds	.....	.....	6	2
Lennox	1	2	8	2
London	25	1	7	1
Manitoulin	4	.....	1	.....
Middlesex, North	3	2	11	7
Middlesex, West	1	.....	.....	.....
Monck	5	.....	3	.....

SCHEDULE I.—Continued.

Statement showing number of cases prosecuted, etc.—Continued.

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Muskoka	4	1	9	3
Nipissing	1	.....	2	1
Norfolk, South	2	2	.....	.....
Ontario, North	6	1	12	.....
Ontario, South	3	2	1	.....
Ottawa	5	3	3	1
Oxford, North	2	1	12	.....
Oxford, South	.....	1	3	.....
Parry Sound, East	3	6	3	.....
Parry Sound, West	3	.....	16	2
Peel	.....	.....	3	1
Perth, North	21	1	.....	.....
Perth, South	1	.....	3	.....
Peterborough, East	1	1	2	2
Peterborough, West	1	3	6	.....
Port Arthur	2	.....	6	.....
Prescott	25	9	20	.....
Prince Edward	4	1	29	6
Rainy River	3	.....	.....	.....
Renfrew, North	.....	.....	7	.....
Renfrew, South	11	3	20	1
Russell	2	1	.....	2
St. Catharines	9	.....	11	3
Sault Ste. Marie	3	.....	11	3
Simcoe, Centre	3	2	13	8
Simcoe, East	.....	.....	16	8
Simcoe, South	4	.....	3	1
Simcoe, West	1	2	3	.....
Stormont	6	3	7	2
Sturgeon Falls	1	.....	.....	2
Sudbury	5	.....	39	8
Temiskaming	1	.....	213	15
Toronto	1	1	41	36
Victoria, East	.....	1	.....	2
Victoria, West	1	.....	6	1
Waterloo, North	10	.....	3	.....
Waterloo, South	7	1	7	.....
Welland	13	1	2	.....
Wellington, East	2	1	5	.....
Wellington, South	10	2	23	4
Wellington, West	8	1	3	.....
Wentworth, North	1	.....	1	.....
Windsor	13	6	.....	1
York, North	.....	.....	4	1
York, West	3	2	4	1
Total	458	146	863	192

SCHEDULE I.—Concluded.

Statement showing number of cases prosecuted, etc.—Concluded.

Municipality in which Dunkin Act or Local Option in force.	License District of	Dunkin Act or Local Option.	No. of Convictions.	No. of Dismissals.
Huron	Bruce, Centre	L. O.	4	.....
Arran	Bruce, North	"	1	.....
Hepworth	" "	"	1	2
Saugeen	" "	"	3	.....
Southampton	" "	"	4	.....
Tara	" "	"	2	2
Huntley	Carleton	"	1	1
Manvers	Durham, East	"	1	.....
Millbrook	" "	"	2	.....
Southwold	Elgin, West	"	1	.....
Portland	Frontenac	"	2	.....
Cardinal	Grenville	"	1	.....
Artemesia	Grey, Centre	"	2	.....
Thornbury	" "	"	1	.....
Owen Sound	Grey, North	"	34	35
Durham	Grey, South	"	2	.....
Egremont	" "	"	1	.....
Rawdon	Hastings, North	"	4	1
Stanley	Huron, South	"	3	.....
Camden	Kent, East	"	1	.....
Moore	Lambton, West	"	5	6
Dalhousie	Lanark, North	"	1	.....
Grimsby Vil.	Lincoln	"	2	.....
South Grimsby	"	"	3	.....
Niagara	"	"	3	.....
Caistor	Monck	"	1	.....
McLean and Ridout	Muskoka	"	2	.....
Waterford	Norfolk, North	"	2	.....
North Walsingham	Norfolk, South	"	3	1
Brighton	Northumberland, East	"	2	.....
Colborne	" "	"	7	1
Hamilton	Northumberland, West	"	4	1
Scott	Ontario, North	"	1	.....
Pickering	Ontario, South	"	2	1
Chinguacousy	Peel	"	1	.....
Norwich	Oxford, South	"	9	1
Norwood	Peterboro', East	"	2	1
Ameliasburg	Prince Edward	"	1	.....
Midland	Simcoe, East	"	14	3
Medonte	" "	"	4	1
Creemore	Simcoe, West	"	2	.....
Nottawasaga	" "	"	1	1
Fenelon	Victoria East	"	1	.....
Somerville	" "	"	3	16
Eldon	Victoria, West	"	2	.....
Mariposa	" "	"	1	.....
Woodville	" "	"	2	1
Erin	Wellington, East	"	5	1
Ancaster	Wentworth, South	"	2	1
Markham Tp.	York, East	"	.....	4
Stouffville	" "	"	3	1
Whitchurch	York, North	"	1	1
Weston	York, West	"	3	.....
West Toronto	" "	"	2	.....
Vaughan	" "	"	.....	1
Totals	.....	.....	168	84

SCHEDULE J.

Showing fines imposed and collected in Municipalities under Local Option during the license years 1907 8 and 1908-9.

Municipality.	License District.	Fines imposed. 1907-8	Fines collected. 1907-8	Fines imposed. 1908-9	Fines collected. 1908-9
Johnston, Tarbutt and Tarbutt additional	Algoma	$ 50	$ 50		
Onondaga	Brant, South	20	20		
Huron	Bruce, Centre	95	95	$ 170	$ 170
Amabel	Bruce, North	70	70		
Arran	" "			50	50
Hepworth	" "			90	90
Saugeen	" "			50	50
Southampton	" "	115	115	100	100
Tara	" "	100	100	40	40
Bolton	Cardwell	100	100		
Tecumseth	"	50	50		
Huntley	Carleton	50	50	75	75
Mountain	Dundas	20	20		
Winchester	"	50	50		
Cavan	Durham, East	50	50		
Manvers	" "	100	100	60	60
Millbrook	" "			75	75
Southwold	Elgin, West			100	100
Portland	Frontenac			90	90
Storrington	"	50	50		
Cardinal	Grenville			50	50
Artemesia	Grey, Centre			70	70
Collingwood Tp.	" "	50	50		
Thornbury	" "			50	5
Derby	Grey, North	100	100		
Keppel	" "	40	40		
Owen Sound	" "	2,240	2,090	1,585	1,485
Durham	Grey, South			70	70
Egremont	" "	100	100	40	40
Rawdon	Hastings, North	75	75	160	160
Hensall	Huron, South	50	50		
Stanley	"	30	30	120	120
Camden	Kent, East	20	20	60	60
Raleigh	Kent, West	150	150		
Arkona	Lambton, East	50	50		
Moore	Lambton, West	250	250	365	365
Dalhousie	Lanark, North	50	50	50	50
Grimsby	Lincoln			100	100
South Grimsby	"	35	35	85	85
Niagara	"			175	175
Caistor	Monck			20	20
Gainsborough	"	70	70		
McLean and Ridout	Muskoka			70	70
Port Carling	"	10	10		
Waterford	Norfolk, North			100	100
North Walsingham	Norfolk, South	50	50	50	50
Brighton	Northumberland, East			100	100
Colborne	" "			310	310
Hamilton	Northumberland, West			110	110
Scott	Ontario, North	70	20	20	20
Pickering	Ontario, South			20	20
Reach	" "	50			
East Nissouri	Oxford, North	170	170		

SCHEDULE J.—*Continued.*

Showing fines imposed and collected in Municipalities under Local Option during the license years 1907-8 and 1908-9.

Municipality.	License District.	Fines imposed.	Fines collected.	Fines imposed	Fines collected.
		1907–8.	1907–8.	1908–9.	1908–9
Norwich	Oxford, South	.....	.....	315	265
Chinguacousy	Peel	.....	.....	20	20
Norwood	Peterboro', East	.....	.....	50	50
Lakefield	Peterboro', West	.....	.....	60	60
Smith	" "	.....	.....	50	50
McNabb	Renfrew, South	20	20	.....	.....
Osgoode	Russell	50	50	.....	.....
Medonte	Simcoe, East	.....	.....	235	235
Midland	" "	270	270	665	665
Oro	" "	20	20	20	20
Creemore	Simcoe, West	.....	.....	90	90
Nottawasaga	" "	.....	.....	30	30
Fenelon	Victoria, East	.....	.....	50	50
Somerville	" "	.....	.....	100	100
Eldon	Victoria, West	.....	.....	75	75
Mariposa	" "	.....	.....	20	20
Woodville	" "	.....	.....	70	70
Erin	Wellington, East	.....	.....	150	150
West Garafaxa	" "	50	50	.....	.....
Peel	Wellington, West	100	100	.....	.....
Ancaster	Wentworth, South	.....	.....	90	90
Markham Tp.	York, East	50	50	.....	.....
Richmond Hill	" "	110	110	.....	.....
Stouffville	" North	20	*120	150	150
Whitchurch	" "	140	140	50	50
Weston	York, West	.....	.....	130	20
West Toronto	" "	525	475	160	100
Vaughan	" "	170	170	.....	.....
Totals		$6,105	$5,905	$7,260	$6,940

* $100 imposed, 1906-7.

SCHEDULE K.

License District.	Inspector.	P. O. Address.
Addington	James Williams	Arden.
Algoma	James Grigg	Bruce Mines.
Brant, North	A. Kirkpatrick	Paris.
Brant, South	John McCann	Brantford.
Brockville	George Ross	Brockville.
Bruce, Centre	Thomas Bradley	Bervie.
Bruce, North	J. W. Reany	Burgoyne.
Bruce, South	Benj. Cannon	Walkerton.
Carleton	Thomas Kerr	Kars.
Dufferin	S. McDowell	Dundalk.
Dundas	Edward P. Foster	Dundela.
Durham, East	John Kennedy	Pontypool.
Durham, West	J. S. McConnachie	Bowmanville.
Elgin, East	W. R. Andrews	Bayham.
Elgin, West	Edward W. Compton	St. Thomas.
Essex, North	Paul Morand	Tecumseth.
Essex, South	James A. Smyth	Essex.
Fort William	James Davidson	Fort William.
Frontenac	John Moreland	Sydenham.
Glengarry	Angus Macdonald	Alexandria.
Grenville	And. Carson	Burritt's Rapids.
Grey, Centre	S. J. Halbert	Markdale.
Grey, North	M. C. Beckett	Owen Sound.
Grey, South	Thomas Davis	Durham.
Haldimand	J. B. Wilson	Hagersville.
Haliburton	J. R. Erskine	Haliburton.
Halton	W. A. Ferrah	Oakville.
Hamilton	J. Sturdy	Hamilton.
Hastings, East	John Stokes	Tweed.
"	Robert M. Jack, Prov. Officer	Deseronto.
Hastings, North	Thomas H. Moore	Queensboro'.
Hastings, West	Hugh Walker	Belleville.
"	P. J. Peterson, Prov. Officer	Trenton.
"	Jacob Hubble " "	Frankford.
Huron, Centre	William Clegg	Wingham.
Huron, North	John Torrance, Sr.	Clinton.
Huron, South	Alfred Asquith	Auburn.
Kenora	Jno. Branchley	Kenora.
Kent, East	B. W. Wilson	Ridgetown.
Kent, West	Thos. M. French	Chatham.
Kingston	Clark W. Wright	Kingston.
Lambton, East	P. D. McCallum	Forest.
Lambton, West	George Lucas	Sarnia.
Lanark, North	J. J. McGregor	Carleton Place.
Lanark, South	S. M. Barnes	Perth.
Leeds	F. B. Taber	Morton.
Lennox	Walker Exley	Napanee.
Lincoln	John W. King	St. Catharines.
London	A. R. Galpin	London.

SCHEDULE K.—Continued.

License District.	Inspector.	P. O. Address.
Manitoulin	Wm. Vincer	Mindemoya.
Middlesex, East	Thomas Duffin	Thorndale.
Middlesex, North	Thomas Magladery	Parkhill.
Middlesex, West	John B. Gough	Napier.
Monck	R. N. Killins	Dunnville.
Muskoka	Henry Boyer	Bracebridge.
Nipissing	Jos. N. Lewis	Mattawa.
	J. W. Richardson, Prov. Officer	North Bay.
Norfolk, North	A. W. Birdsell	Waterford.
Norfolk, South	And. Innes	Port Dover.
Northumberland, East	George Gooderich	Dundonald.
" "	A. Chapman, Prov. Officer	Hastings.
Northumberland, West	John McCaughey	Cobourg.
Ontario, North	Charles Kelly	Uxbridge.
Ontario, South	Louis Luke	Oshawa.
Ottawa	John C. Enright	Ottawa.
	Alfred Coleman	Ottawa.
Oxford, North	Walter Shaver	Woodstock.
Oxford, South	Wm. M. Bell	Springford.
Parry Sound, East	W. J. White	Novar.
Parry Sound, West	T. W. Quinn	Parry Sound.
Peel	John D. Orr	Meadowvale.
Perth, North	Robert T. Kemp	Listowel.
" "	Geo. T. Jones, Prov. Officer	Stratford.
Perth, South	Alex. B. Creighton	St. Mary's.
Peterborough, East	Elias Williams	Havelock.
Peterborough, West	Joseph Stewart	Peterborough.
Port Arthur	Alex. R. Elliott	Port Arthur.
Prescott	Joseph Lemieux	Fournier.
Prince Edward	W. G. Sexsmith	Picton.
Rainy River	George Campbell	Fort Frances.
Renfrew, North	Samuel Bromley	Pembroke.
Renfrew, South	John Connolly	Renfrew.
Russell	W. J. Campbell	Metcalfe.
Sault Ste. Marie	Wm. R. Cunningham	Sault Ste. Marie.
St. Catharines	John W. King	St. Catharines.
Simcoe, Centre	Thomas Duff	Barrie.
Simcoe, East	Wellington Fisher	Orillia.
Simcoe, South	R. W. Sloan	Churchill.
Simcoe, West	Robert Henderson	Alliston.
" "	Geo. W. Montgomery, Prov. Officer	Collingwood.
Stormont	A. E. Fetterley	Aultsville.
"	J. M. McDonald, Prov. Officer	Cornwall.
Sturgeon Falls	J. J. French	Sturgeon Falls.
Sudbury	Leo Croteau	Sudbury.
Temiskaming	Wm. S. Blackwall	Haileybury.
Toronto	Joseph Johnston	Toronto.
	Robert Burroughs	Toronto.
	P. J. Jennings	Toronto.
Victoria, East	James Lithgow	Bobcaygeon.
Victoria, West	William Thornbury	Lindsay.
Waterloo, North	Ferdinand Walter	Berlin.
Waterloo, South	R. H. Knowles	Hespeler.

SCHEDULE K.—Concluded.

License District.	Inspector.	P. O. Address.
Welland	Geo. House	Stevensville.
Wellington, East	Josiah Hampton	Mount Forest.
Wellington, South	J. W. Oakes	Guelph.
Wellington, West	John Gordon	Drayton.
Wentworth, North	John Nicholson	Watertown.
Wentworth, South	R. T. Gould	Bartonville.
Windsor	Gaspard Pacaud	Windsor.
York, East	Wm. M. Thompson	Danforth.
York, North	James Wayling	Newmarket.
York, West	D. MacKenzie	Woodbridge.

STATEMENT OF LICENSE REVENUE FOR FINANCIAL YEARS.

Statement shewing Revenue from Liquor Licenses received by the Province of Ontario for the financial years endlng 31st December, 1907 and 1908 and the ten months ending October 31st, 1909.

Revenue for:

1907	Brewers' Warehouse Licenses	$5,533 34	
	Brewers' Licenses	28,826 20	
	Distillers' Licenses	43,166 66	
	Wholesale Licenses	9,300 25	
	Tavern and Shop and Club Licenses, Transfers and Fines	497,918 15	
	Refund for Collection of Revenue and Premium on Fidelity Bonds	2,187 00	
	Refund on Detective Services	195 00	
			$587,126 60
1908	Brewers' Warehouse Licenses	$6,300 00	
	Brewers' Licenses	30,562 50	
	Distillers' Licenses	44,666 67	
	Wholesale Licenses	9,487 75	
	Tavern and Shop Licenses, Transfers and Fines	485,098 44	
	Refund for Collection of Revenue and Premium on Fidelity Bonds	1,655 75	
			$577,771 11
1909	Brewers' Warehouse Licenses	$7,000 00	
	Brewers' Licenses	31,400 00	
	Distillers' Licenses	44,666 67	
	Wholesale Licenses	8,600 00	
	Sample and Commission Licenses	3,900 00	
	Seized Liquor	1,133 83	
	Tavern and Shop Licenses, Transfers and Fines	254,895 29	
	Refund for Collection of Revenue and Premium on Fidelity Bonds	2,186 75	
	Fines from L. O. Thamesville	146 52	
			$353,929.06

MACDONALD INSTITUTE.

ONTARIO AGRICULTURAL COLLEGE.

MACDONALD HALL.

REPORT

OF THE

Minister of Agriculture

FOR THE YEAR ENDING

OCTOBER 31, 1910

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REPORT OF

Minister of Agriculture.

To the Honourable John M. Gibson, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:—

I have the honour to submit the First Annual Report of this Department for the fiscal year ending October 31, 1910.

In previous years it has been the practice for each Branch of the Department to issue a Report of its own work in an individual volume, and these combined have made up the Report of the Department. I deem it wise, however, to supplement this with a Report of the Department as a whole, giving a brief résumé of the leading features of the work carried on by all the Branches. It appears to me also that it is opportune to embody in this initial Report a brief statement of the history of the Department and its different Branches. Aside from its usefulness for purposes of record and reference, I feel that it should have an important place in the agricultural literature of the Province.

While the existence of a Provincial Department of Agriculture in anything like its present form dates back only a little over thirty years, the steps leading thereto are of interest. They cover the strivings of over a century towards agricultural organization. Following closely after the first Legislature of Upper Canada, which met at Niagara (then called Newark) in September, 1792, the first agricultural organization was formed. It was called an Agricultural Society. Its object was to discuss questions relating to agricultural improvement. The holding of exhibitions, which is now the chief work of these societies, was not undertaken for some years. In the early years of their existence they received no financial governmental assistance, but by 1830 they had become so numerous and important as to warrant small appropriations. In 1841 Upper and Lower Canada were united as the Province of Canada, with one governing body, and, in 1846, much growth having been made in the meantime, representatives of the agricultural societies met and organized a Provincial Association. The first object of this Association was the holding of a Provincial Fair at Toronto. It later, however, developed into the Board of Agriculture of Upper Canada, and, with statutory direction and financial government assistance, it extended its field of usefulness. It established records for pure-bred stock and initiated classes in veterinary instruction, out of which the present Ontario Veterinary College grew. Apart from this Board, but working in harmony with it, societies were organized for the encouragement of fruit growing, the study of insects, and the improvement of dairying.

From 1841 to 1867 the two Provinces of Upper and Lower Canada remained united under one Government as the Province of Canada, with a Board of Agriculture in each Province to take care of agricultural affairs. There was, however, one Minister of Agriculture for the combined Province, and he had a seat on each

of the Boards. In 1867 the Confederation of the Provinces into the Dominion of Canada took place and the old Province of Upper Canada now changed its name to that of Ontario, with a Legislature and Provincial Government. In the Government there was a Commissioner of Agriculture, who, however, was also the holder of an additional portfolio; thus the first Commissioner united that of Public Works with Agriculture, and later the Provincial Treasurer was also Commissioner of Agriculture. The old Board of Agriculture had changed its form somewhat, and had become in name The Agriculture and Arts Association. In 1888 an additional portfolio was created, a new member added to the Government, and for the first time a Provincial Minister of Agriculture was appointed.

Since that time the Department has steadily grown, until its organization now includes every branch of agricultural activity. The various stages of its development may be seen in greater detail in the consideration of the work of the different Branches. Suffice it here to state that it now includes the following Branches, each under a distinct head, and many including sub-branches. The Branches are: Agricultural Societies, Agricultural College, Bureau of Industries, Farmers' and Women's Institutes, Live Stock, Fruit, Colonization, Veterinary College. In addition there is the most recent offshoot of the Department, known as District Representatives. Then, although not intimately connected with agriculture, the Factory Inspection and Stationary Engineers' Branches are included under the Department for administrative purposes.

ONTARIO AGRICULTURAL COLLEGE.

Under this Branch, the largest and in many respects the most important Branch of the Department, is directed the work of the College proper for boys, the Macdonald Institute for girls, experimental work of various kinds in the interests of the farmers as a whole, Experimental Union, extension work in nature study in the public schools, extension work in forestry and a separate forestry station, extensive drainage work.

It is of interest to recall that the first step towards the establishment of the College was taken by Sir John Carling, as Commissioner of Agriculture and Arts, in 1869, when on August 12th he appointed Rev. W. F. Clarke, editor of *The Ontario Farmer,* to collect information with reference to agricultural colleges in the United States, and to recommend a plan for one in Ontario. The report was submitted in June, 1870, recommending a school for agriculture and a school for mechanic arts. Immediate action followed by the purchase of 600 acres of land for a school of agriculture at Mimico, seven miles west of Toronto. Although contracts were let for buildings, objections were raised to the site, and in the change of Government which followed some delay occurred. The result was that the Mimico site was abandoned, and in 1873 the present site of 550 acres at Guelph was purchased. On the first of May, 1874, the school opened with 26 pupils. Internal troubles immediately developed, and in July the 26 students went on strike against the President, who promptly resigned. A reorganization occurred, and greater progress was made. For a year at the start, and for a number of years after 1885, there was an Advisory Council to assist the President in the management of the College, but for the past ten years the President has been directly responsible to the Minister. This has been found to be the most satisfactory policy.

Buildings have been added from time to time, the chief buildings now being President's residence and administration offices, men's residence, accommodating 218 students, Massey Hall and Library, biology and physics building, horticulture building, chemistry building, gymnasium, agriculture building, judging pavilion, machinery hall, Macdonald Hall, Macdonald Institute. Altogether there is represented an investment of one million dollars.

As far as the work of the College proper is concerned, it is directed along two lines: (*a*) To teach agriculture to boys and men who come from the farm; (*b*) to conduct experiments in all the branches of agricultural research, with the object of helping Ontario farmers to make more money on their own farms. In this work there are at present engaged, in addition to the President, 15 professors, 2 associate professors, 9 lecturers, 7 demonstrators, 1 fellow. Three distinct courses are conducted. The College is in affiliation with the University of Toronto, and there is a four years' course which carries with it the degree of B.S.A. (Bachelor of the Science of Agriculture). Then there is a two years' course, which is rewarded with an associate diploma. To reach those who cannot spare the time for either of these, short courses in special subjects, extending from two weeks to three months, are conducted during the winter term.

LARGEST ATTENDANCE IN HISTORY.

Perhaps the best indication of the usefulness of the College is the ever-increasing attendance. During the past year the attendance was the highest in the history of the College, aggregating 1,386, including Macdonald Institute. This was 88 over the high record of the previous year.

This aggregate included 975 men between 16 and 40 years of age and averaging 21 years, earnestly endeavouring to fit themselves for better agriculture. Those in the general course numbered 443, while those taking the short courses slightly exceeded that number. At the end of the last term 28 took the degree of B.S.A., and 74 the Associate Diploma, thus going out well equipped into the only profession that is not overcrowded. But there can be no doubt that the short courses, based on the idea that people learn more by seeing and doing than by reading, accomplish great good. At the two weeks' course in stock and seed judging there were 248 present; at the two weeks' course in fruit growing, 107; at the four weeks' course in poultry, 24; at the three months' course in butter and cheese making, 42.

Naturally, practically all those taking the short courses came from Ontario farms and went back to Ontario farms, but it is interesting to note that in the regular student body there are representatives from all the Provinces of the Dominion and seventeen outside countries. Ontario students are admitted on a fee of $20, while the fee for those from other Provinces is $50, and from outside Canada $100 a year. Of the 443 in the general course, Ontario contributed 303, other Provinces ranking as follows: British Columbia, 27; Nova Scotia, 11; Alberta, 9; Saskatchewan, 8; Manitoba, 4; New Brunswick, 2; Quebec, 2. From outside countries the record is: England, 26; South Africa, 12; United States, 10; Scotland, 6; Jamaica, 5; Ireland, 3; Wales, 2; Japan, 2; New Zealand, 2; Argentine, 2; Brazil, 1; East Indies, 1; France, 1; India, 1; Spain, 1; Germany, 1.

The remark is sometimes heard that a course at the College tends to educate the boy off the farm. If such a statement could be substantiated, I would regard it as a serious reflection on the work of the College, but fortunately it is not borne out by the facts. It cannot be too strongly impressed that the practical test of a college course must be in producing results on the farm. At the same time, it must be recognized that if agricultural colleges, district representatives and agricultural journals are to do the work for which they are intended, there must be teachers. It is even obvious that in any one of these capacities a graduate should render greater service to the community than he could on a farm of his own. For this work the four-year men taking the B.S.A. course are drawn on very largely, and in this connection graduates of the Ontario Agricultural College have always achieved distinction. Notwithstanding this, it is gratifying to be able to say that not more than a small percentage of those who take courses at the College go into professional agriculture, while the balance go back to the land and realize the highest function of the College.

MACDONALD INSTITUTE AND ITS WORK.

In 1904 Sir William C. Macdonald presented to the Province two magnificent buildings for the teaching of domestic science. One of the buildings is known as Macdonald Institute, and is used for class and laboratory work, and the other as Macdonald Hall, used for a girls' residence. It was decided that the new Department of Home Economics should be under the general direction of the President of the College, with a distinct faculty of instruction. This faculty now numbers ten.

Three courses are offered, with the object of fitting girls and women for the great work of home-making. Only subjects which bear on this work are taught, and hence no courses are offered in music, painting or languages. One course is timed for one year, but may be extended to two. The other two courses cover three months each. Then there is a one-month course in the summer.

During the past year the total attendance was 311, and as far as the residence was concerned there was always a waiting list. Preference in the courses is given to the girls or women from the farm. The great majority of the students go back to their homes to put in practice the knowledge gained. A number, however, fit themselves for teachers of domestic science, while a few take the professional housekeeper course, with a view to supervising the housekeeping work in large institutions, such as hospitals and asylums.

THE PIONEER ONE-DAY COURSE.

In addition to the work accomplished through the numerous courses, there are many ways in which the College renders distinct and practical service to the Province, and it is now my purpose to indicate a few of these.

For some years past it has opened its gates in the month of June to farmers from all parts of the Province, and in June last upwards of 40,000 took advantage of the invitation. This may be properly described as the pioneer one-day course. While it constitutes a splendid day's outing, there is much that is genuinely educational. The excursions are managed by the Farmers' Institutes, and from one to three from different country districts arrive at the College every day during June. Immediately on arrival they are entertained to lunch in the College gymnasium, after which they are personally conducted over the farm and garden and through the live stock stables and the poultry and dairy plants. Afterwards, in smaller groups, they visit the vegetable garden, the laboratories or other points of interest. The professors give short talks and answer questions, and in this way much information of value is disseminated. The value of these excursions is evidenced by the fact that hundreds come back every year, and find something of new interest each time.

EXPERIMENTAL WORK IS GREAT SERVICE.

But, aside from its general influence, the great service which the College renders to the Province at large is in the experimental work carried on in all departments. The work of the class-room is important, but perhaps not more so than the work in the experimental laboratory or experimental plot. The tests with grains in the field plots and in feeding are well known, but the tests carried on in the chemical laboratory have an important bearing on both of these. The work in the bacteriological laboratory finds its outward expression in the success of dairy work. The work in entomology and botany shows the way to the extermination of insect pests and weeds. Some of this work does not figure as prominently before the public as other work, but its value should not be therefore underestimated. The results are made known through addresses at various public meetings, through press articles and bulletins. In addition, each department handles a large correspondence, and in this way assists farmers in meeting weed, insect or other problems with which they may be confronted.

FARM CROPS AND EXPERIMENTAL UNION.

Naturally, a prominent feature of experimental work is that carried on with regard to farm crops. Many of the leading varieties of grain now in general cultivation in Ontario were introduced and tested by the College and distributed through the Ontario Agricultural and Experimental Union, of which the Professor of Field Husbandry is permanent Secretary. Thirty years ago the Experimental Union was started by a few graduates of the College, but later its membership was extended to include other progressive farmers as well. It receives a

Display of Apples from Demonstration Orchards which took many prizes at Ontario Fruit, Flower and Honey Show, 1910.

special grant from the Government of $2,750. There is now a membership of 5,000. Experiments are conducted on 2,000 plots at the College, and then samples are distributed and the experiments continued on the 5,000 farms of Union members. Experiments in fertilizers, in feeding stock, in poultry raising and in other lines, are also conducted, the different College experts rendering assistance in their own particular line. The members meet at the College once a year and compare results, and a report is issued.

The tests on the College plots extend over a period of five years or more, but it has been found that many new varieties surpassed old varieties in productiveness. Under uniform tests, repeated for several years in succession, it has been found that in average yield of grain per acre some varieties have surpassed other varieties as follows:

Daubeney over Tartar King oats by 19.4 bushels.
Mandscheuri over Mensury six-rowed barley by 11.4 bushels.
Dawson's Golden Chaff over Early Red Clawson winter wheat by 6.7 bushels.
Minnesota No. 163 over Colorado spring wheat by 7 bushels.
Mammoth White over Thousandfold winter rye by 7.9 bushels.
Petkos over Common spring rye by 3.9 bushels.
Early Britain over Golden Vine field peas by 10.1 bushels.
Pearce's Improved Tree over Small White Field beans by 5 bushels.
Siberian over Common millet by 16.3 bushels.
Yellow Leviathan over Mammoth Red Intermediate mangel by 7.3 tons.
White Cap Yellow Dent over Longfellow corn by 16.6 bushels.

Through the adoption of better methods of farming and the use of better varieties, a number of our farm crops have been increasing in yield per acre considerably during recent years. According to the reports of the Bureau of Industries for Ontario, the average yield per acre of barley in Ontario has been as follows: For the eight years from 1886 to 1893, 24 bushels; for the eight years from 1894 to 1901, 27.1 bushels; and for the eight years from 1902 to 1909, 31 bushels.

In an experiment which has been conducted at the College for several years in succession, it has been found that a mixture of oats and barley, when the right varieties and the right proportions are used, will produce on an average more than 200 pounds per acre more than either one when grown alone.

In another experiment, which has been conducted from five to eight years with each of eleven different classes of farm crops, the average results show that the large seed surpassed the small seed by 19.1 per cent. for the grain crops, 40.3 per cent. for the rape, and 60.1 per cent. for the root crops.

In a carefully conducted test made in duplicate in each of five years with spring wheat, barley, oats and peas, by sowing each grain on each of six different dates in the spring of the year, starting as early in the spring as the land is warm enough and dry enough to work to good advantage and allowing one week between each two dates of seeding, it was found that it was important to sow the grains in the order referred to. It was also found that for every day's delay in the seeding after the first week had passed in which the earliest seeding took place, there was an average decrease of 56 lbs. of oats, 53 lbs. of barley, 29 lbs. of spring wheat, and 23 lbs. of peas per acre.

From various tests which have been made in the growing of annual crops, both singly and in combination for pasture purposes in the same year in which they have been sown, it has been learned that a mixture of 51 lbs. of oats, 30 lbs. of Early Amber Sugar Cane, and 7 lbs. of Common Red Clover seed per acre has given very satisfactory results. If this is sown early in May, it is usually suitable

for pasturing in about six weeks after the seeding takes place. The pasture is usually abundant in growth, continuous throughout the rest of the season, healthful and appetizing to the stock, and capable of producing a good increase in the weights of the animals.

Besides the work of testing and introducing new varieties of farm crops, a considerable amount of work has been carried on recently in the improvement of some of the best varieties through systematic selection and through hybridization. A few of the improved strains, such as the O. A. C. Number 21 barley, have been distributed, and other improved strains and hybrids will likely be sent out to the farmers in the near future.

ACTIVITY IN POULTRY INDUSTRY.

Through the Poultry Department much work has been done on behalf of the industry of the province as a whole, aside from the courses of instruction. The remarkable feature in connection with the poultry industry has been the development of the home market. In this connection the figures of exports furnish astounding reading. In 1902 Canada exported 11,635,108 dozen eggs; in the same year Canada exported dressed and undressed poultry to the value of $238,047. Since then there has been a steady falling off in the number and value of exports until in 1910 there were no exports of either eggs or poultry. Along with this must be taken the fact that in Ontario in that period the number of poultry has increased fully 25 per cent., and the production of eggs must have increased accordingly. During the same period there has also been an increase of 25 per cent. in the price of eggs and 33 per cent. in the price of dressed poultry.

All this indicates that there are splendid opportunities in this industry in Ontario, and during the past year there were many indications that the opportunities were being taken advantage of. The demand for eggs for hatching and for birds for breeding purposes has been exceptional and the poultry department sold fifteen thousand eggs for hatching and nearly five hundred birds for breeding purposes. There has also been a steady increase in the demand for eggs of good quality for domestic uses. The department has contracted to sell all of its surplus production for the winter months at fifty cents per dozen.

For a number of years the department here has put forth special effort in trying to increase the egg production of a certain family of chickens. This fall it was thought wise to try out this family of chickens, in comparison with the ordinary run of birds bred by common breeders. The difference in the egg production of twenty-three birds for the months of October and November was 372 in favor of the bred-to-lay stock. This was mainly due to the fact that the birds that had been bred for egg production were much earlier to mature, consequently had a better start before the cold weather set in.

Experiments have also been conducted by the department in fattening and dressing poultry in preparation for the market. These experiments have shown that a pound of flesh can be put on the ordinary grade chicken for about four pounds of grain.

Assistance has also been rendered to the poultry industry of the province through exhibitions and meetings and by means of lectures and literature.

TESTING WATER AND WHEAT.

In the Chemistry Department some experiments have been made in connection with water from country wells. It has been found that many of the wells,

especially the old shallow wells, are becoming polluted. Twenty-six samples were examined during the past year, and of these twenty-two were found to be unfit for domestic use. A systematic study is being made of the whole matter, and a bulletin will be issued, giving the results and making recommendations for improvement.

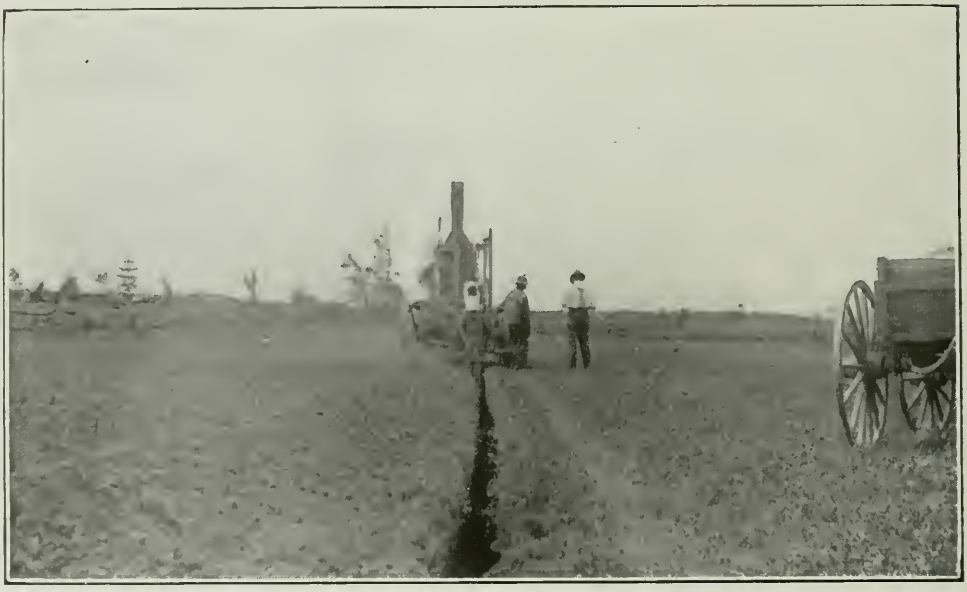
Then, too, considerable was done during the past year in connection with a new line of work undertaken by this department in the testing of the bread-producing value of wheat and flour. The department is equipped with an up-to-date flour and baking laboratory, including apparatus for testing grain, producing flour, electric bake ovens for making bread, so that the whole process from grain to finished product may be carried out. Small samples of all the varieties of wheat grown on the trial plots are milled and baked to determine their strength, or value for bread purposes, thus supplementing the work of the experimental department, and giving a clear basis for determining the most valuable variety of wheat. For the assistance and guidance of the miller the grades of wheat from the Western Provinces are studied each year, to demonstrate the quality of the wheat and give the millers early in the season full information regarding the peculiarities of the wheat of the new crop. Furthermore, by baking samples of flour sent to the laboratory, the miller is supplied with information which makes it possible for him so to blend the wheats at his disposal as to secure the best results, and to keep his grades of flour up to a determined standard. The baking tests also clearly demonstrate the comparative value of various samples of flour. Such tests make it possible for the miller to sell and the baker to buy flour according to sample and baking tests, and in this way the department is of service in placing this business on a better basis. Two hundred and fifty samples have been tested for millers and bakers in the last twelve months. Considerable work has also been done in the way of elucidating some of the technical problems of both the miller and baker.

In addition to testing over 200 varieties of mill by-products and mixtures which have been offered for sale as cattle food, and carrying on experiments of value to cheesemakers, the department has studied the newer insecticides and fungicides, especially lime and sulphur washes. The results have proven of great value to the fruit growers of the Province.

BIG ADVANCE IN DRAINAGE.

Drainage is a matter for demonstration rather than experiment. A separate department for the carrying on of this work was created in connection with the College in 1905, and an active drainage campaign launched in 1906. Last year the grant for the work was increased from $1,000 to $4,000, and under this impetus great progress has been made. The plan has been for the drainage experts to go from place to place holding demonstrations of how the land should be drained and making surveys. During the past year 132 of these drainage demonstrations have been held, with an average attendance of 24. Surveys have been made for 14,672 acres, slightly in excess of the total acreage surveyed in the five previous years during which the work has been carried on. At the end of the year there were 109 applications for surveys unfilled. The tile output of the past year was 29 per cent. greater than the previous year, which means an increase of approximately 8,000,000 tile. From this it is estimated that the increase in the land drained would be approximately 16,000 acres. This would, of course, include not only the work directed from the College, but also the work done under the super-

vision of the district representatives of this Department, as well as the activity resulting from these educational agencies. These figures show that drainage is one of the big features of present agricultural development. Reports indicate that drained land produced $20 per acre more than land in need of draining, and it can, therefore, be readily appreciated that the work in this connection is adding immensely to the productivity of the Province.



Drainage Work—Here is a ditcher in Lanark County travelling at rate of two rods in four minutes and cutting two feet nine inches deep.

CARRYING AGRICULTURE TO PUBLIC SCHOOLS.

For many years past the problem of getting agricultural instruction into the Public Schools has puzzled educationists and all others who have given thought to the matter. During the past two years a plan with this object in view has been quietly worked out through the Nature Study Department, which was established as a personal and practical link between the College and the schools of the Province. Sufficient progress has already been made to show that it is slowly but surely accomplishing the purpose in view.

Recognizing that the absence of properly qualified teachers was one of the chief obstacles in the way of agricultural teaching, plans were adopted to overcome this difficulty. A normal course in elementary agriculture and horticulture was arranged for April, May and June, and at the last course there were 41 in attendance. Then in the July summer school 50 more teachers took nature study and 10 elementary agriculture. Part of the work is covered by a winter reading course. Certificates are granted by the Department of Education and special grants are made to holders of such certificates. This work is supplemented by literature and correspondence. Bulletins are issued and distributed among both teachers and inspectors. Teachers' Associations hold conventions at the College, with special programs along these lines.

Then, through the Schools Division of the Experimental Union an effort is made to reach both pupils and teachers. Last year, although only the second year of the work, 8,000 children and over 500 teachers were provided with seeds for garden work, such as tulip bulbs, forest tree seedlings, tree seeds, vines, samples of the best winter wheat, agricultural seeds and weed seed collections. Arrangements have also been made during June excursions to bring the pupils and their teachers to the College, where they receive special attention and instruction. In addition, a great amount of work is done by correspondence both with teachers and pupils. Text books are recommended, weeds and plants are identified, advice given about gardens, etc. Great interest has been evidenced in this work in the past year and there are signs that its usefulness will continue to increase.

Waterloo County Rural School pupil with his farm crop of sugar beets.

DEVELOPING FORESTRY.

Through the Department of Forestry is being developed and encouraged the important work of reforestation throughout the Province. This is in addition to the course of lectures delivered by the Professor of Forestry to the second year class to give the agricultural student a knowledge of the care and protection of trees as related to the farm.

As to the outside work, one of the most important branches is the Forest Station in Norfolk County. This is located in Walsingham Township, the nearest post office and railroad point being St. Williams. The soil is of a light, sandy nature, unsuitable for agricultural purposes. Hence it was selected as a good site for experiments in the work of reclaiming waste lands, of which there are thousands of acres in Ontario, and also as a forest nursery to produce trees and seed-

lings for general distribution throughout the Province. A start was made in July, 1908, by the purchase of 100 acres, but later in the same year 200 acres more were added. In 1909 this was further increased by the purchase of 600 acres, while during the year just closed another 400 acres have been added, making a total of 1,300 acres at the present time.

Much progress has also been made in developing the nursery work, the College woodlots having been transferred to the Norfolk Station. There are at present 800,000 forest plants in nursery lines and about 1,500,000 seedlings in seed beds. During the past year there were set out some 200,000 plants, chiefly white pine, Scotch pine, jack pine, black locust, chestnut and red oak. These are experimental plantings and are expected to prove of great value in future reclamation work in the Province.

Evergreen Seed Beds in the Forest Nursery at Norfolk Forest Station. In very bright weather they are protected from the sun by the screens.

With this nursery as a basis, much work has been done in the distribution of forest tree seedlings to those who desired to plant waste land or fill in thinned out woodlots. This distribution is made on the co-operative plan. The department agrees as far as possible to supply seedlings free of charge sufficient to plant up to two acres in any one year. The applicant agrees to pay express charges and plant on waste portions of the farm, such as sandy spots or steep hillsides. Every assistance possible is rendered by the department in directing the work along proper lines. Altogether about 200,000 forest tree seedlings were distributed in this way during the past year. These went out to private individuals, chiefly farmers, in various parts of the Province, and the range of interest is shown by the fact that the material entered twenty-seven different counties, mostly in the older settled districts of Southwestern Ontario. In addition, through the School Division of the Experimental Union, sixty collections of forest tree seedlings went out to public schools to be used in school gardens or for planting in some suitable

Planting Pine on waste land at Norfolk Forest Station, in Spring of 1909.

Same scene as above after one year's growth.

place about the school grounds. For this distribution work it has been found cheaper to import the Scotch pine from Germany than to grow it, but the bulk of the other varieties are grown in the Norfolk nursery.

Furthermore, a considerable amount of educational work is done by correspondence, publications and addresses. Not the least gratifying feature in connection with the past year has been the amount of interest displayed in the question by municipal councils and other public bodies. A few municipal councils have asked for legislation with a view to embarking on a forestry enterprise on their own account. In Germany and other European countries, municipalities which undertook reforestation on scientific lines now enjoy incomes sufficient to meet all their municipal taxes. The forests have yielded a profit of from $2.50 to $6.60 an acre, while in rare instances they are said to have yielded as high as $12.00 per acre. There would. therefore, appear to be splendid scope for more activity along these lines on the part of Ontario municipalities.

ONTARIO VETERINARY COLLEGE.

In 1908 the Ontario Veterinary College, located in Toronto, was taken over by the Government in the interests of the live stock industry. Prior to that time it had been conducted as a private institution, except for a short period at its inception, when it was under the Agricultural and Arts Association. Having been thus returned to Provincial control, it is conducted on somewhat similar lines to the Ontario Agricultural College, and is in affiliation with the University of Toronto. The College grants the degree of Veterinary Surgeon, V.S., and the University on a higher standard grants a degree of Bachelor of Veterinary Science, B.V.Sc., followed by that of Doctor of Veterinary Science.

The College has been most successful. Last year the attendance was 372, an increase of 54 over the previous year. Students are attracted from all parts of Canada and the United States. The faculty numbers twenty-one, some of whom, of course, are engaged only for a course of lectures in definite subjects in which they are specialists. In order to keep the institution thoroughly up-to-date, three new subjects were added to the curriculum during the past year—veterinary pharmacy, veterinary jurisprudence, and dairy inspection. The former is taught in the class-room and demonstrated in the laboratory. Veterinary jurisprudence consists of a course of lectures, including a number of subjects which are important to the veterinary surgeon, such as contracts relating to the purchase and sale of live stock, unsoundness and vice in horses or other animals, the straying and impounding of cattle, laws relating to transportation of live stock, laws relating to the spread of malignant diseases, laws relating to diseased meats, laws of the road, the law of warranty and kindred subjects. Dairy inspection includes lectures on the construction of the dairy barn and milk house; the care of utensils; the handling of milk from the time it is drawn from the cow until it is placed upon the market for sale; dairy cattle in health and disease, especially those which are communicable to the human family through milk, and various other matters relating to dairy inspection.

The efficiency of the teaching is indicated by the success of some of the graduates during the past year. In Missouri fifteen went before the State Board of Veterinary Examiners, and, although many had graduated from leading American colleges, the only one to pass was a graduate of the Ontario College. Similarly at Vancouver, B.C., all the candidates were rejected except an Ontario graduate. Illinois has decided to waive the usual State Board examination where an Ontario certificate is the credential. Similar encouraging recognition of the Ontario College has been received from other States.

BUREAU OF INDUSTRIES.

Under this Branch statistics for crop reports and covering agriculture generally are collected and compiled and bulletins and reports are distributed.

Established in 1882, this Bureau preceded the Department itself. It is even a curious fact that until the legislation of last session the Department was legislatively an appendage to the Bureau rather than the Bureau to the Department. The establishment of the Bureau for the collecting of statistics followed the Report of the Royal Agricultural Commission, which conducted an elaborate investigation into agricultural conditions in 1881. Crop bulletins are published three times a year (May, August and November), compiled from the reports of a permanent list of farmer correspondents. In addition there is issued an annual report of farm statistics giving by counties acreage and yields of crops; areas and constitution of farms; numbers and values of live stock on hand and disposed of during the year; value of farm lands, buildings, implements, etc.; market prices of farm crops. In addition, this Bureau collects and compiles statistics of all the organized municipalities in the Province—townships, villages, towns, cities and counties—such as population, assessment, taxation, receipts, expenditures, assets and liabilities.

MANY VALUABLE BULLETINS.

In connection with the Bureau is the mailing department, which handles the distribution of bulletins and reports. The publication of bulletins has increased greatly in the past few years. Following is a list of the new bulletins issued during the past fiscal year and the number of each distributed:

No. 174—"Farm Underdrainage: Does it Pay?"	38,600
175—"Farm Drainage Operations"	10,500
176—"Bacterial Blight of Apple, Pear and Quince Trees"	7,750
177—"Lime-Sulphur Wash"	9,460
178—"Character and Treatment of Swamp or Muck Soils"	4,000
179—"Fruits Recommended for Ontario Planters"	4,000
180—"Flour and Breadmaking"	21,500
181—"The Teeth and Their Care"	32,500
182—"Beekeeping in Ontario"	2,600
183—"Notes on Cheddar Cheese-Making"	4,750
	135,660

In addition to this large number, there were the crop bulletins, and several thousands of fifty different bulletins issued prior to the past year, the supplies of which have not yet been exhausted. Requests are received not only from all parts of Ontario, but also from all parts of the continent and many from abroad as well. Hence the issuing of bulletins cannot be regarded as the least important work of the Department. They are designed to contain practical information in concise form. They are prepared by experts, usually of the College, and are, there-

fore authoritative on the subject with which they deal. Bulletins of a general nature as well as several reports are forwarded regularly to members of Farmers' and Women's Institutes. Bulletins are mailed to those specially interested. For instance, there has been a great demand for a bulletin, entitled "Birds of Ontario" and others relating to nature study on the part of many public school teachers and some pupils. Of the new bulletins it will be noticed that the most widely read was one dealing with drainage and one issued by the Women's Institutes Branch dealing with the care of the teeth. Each is a very important and practical subject in its own sphere, and the success of these bulletins proves that there is great scope for the usefulness of bulletins of a practical nature.

MANY REPORTS ISSUED.

Aside from the bulletins, annual reports are issued in connection with nineteen different lines of work. With the exception of the purely statistical publications, each report contains very valuable addresses or articles on the subjects they are designed to advance, and hence they have a decided educational value. The complete list is as follows:—

The Ontario Agricultural College	30,000
The Experimental Union	30,000
The Ontario Veterinary College	2,500
Agricultural Societies	14,500
Horticultural Societies	10,000
Vegetable Growers' Association	6,000
Live Stock Associations	30,000
Poultry Institute	6,000
Farmers' Institutes, I. and II.	34,000
Women's Institutes, I. and II.	20,000
Dairymen's Associations	30,000
Entomological Society	3,000
Fruit Growers' Association	3,000
Fruit Branch Report	6,500
Ontario Corn Growers' Association	2,500
Beekeepers' Association	2,000
Bureau of Industries (Agricultural Statistics)	7,000
Bureau of Industries (Municipal Statistics)	6,500
	243,500

AGRICULTURAL SOCIETIES BRANCH.

Under this Branch is directed the work of the agricultural societies, including the spring stock shows, the seed fairs and the standing field crop competitions; also the horticultural societies and the Ontario Vegetable Growers' Association.

As already pointed out, agricultural societies are the oldest agricultural organizations in the Province. They have, however, changed greatly since the first one was formed at Niagara in 1792. Originally formed for general agricultural work, the first provincial exhibition was held in 1846 in Toronto. It was then the first provincial organization was formed, and the Ontario Fairs and Exhibitions Association of to-day is its logical descendant, just as the Toronto Exhibition of to-day is the logical descendant of that first provincial show. Those interested will find a complete history of agricultural shows in this Province in the reports issued by that Branch of this Department of 1902-3-4. For many years the value of competitive exhibitions for general agricultural advancement has been recognized, and to-day the local "fall fair" is an educational and social institution of the community. There are now 340 agricultural societies in the Province, and during the past year, according to reports to hand, over 700,000 people attended the local fairs, exclusive, of course, of the attendance at the larger shows in Toronto and other cities, which aggregated considerably over a million. This is at once illustrative of the popularity of the fairs and indicative of the stimulus they impart.

For the carrying on of their work these societies derive their authority from an Act of the Legislature and receive through this Department financial support and personal supervision. As the law at present stands, a society may be formed any place in the Province on petition of sixty ratepayers of the locality, provided there is no other society within twenty miles, or subject to the consent of any other societies within that radius. They receive a grant of $75,000, an increase of $5,000 having been voted last year. There is also a grant of $3,000 additional to societies in the unorganized districts of New Ontario. The grant is distributed on a basis of the expenditure made for agricultural purposes, and each society receives from the Province about one-third of its total expenditure. Upon request, the Department also appoints judges for the fairs, and during the past year 240 of these judges were sent out. The judges are paid $4.00 per day and all expenses. The local society pays back to the Department $6.00 per day for each circuit judge and $8.00 per day for each special judge. Hence, out of a grant of $10,000 for judges last year, the Department received a rebate from the societies of $3,251. All the societies forward their financial statements to the Department and a report is issued annually publishing these, together with the proceedings of the annual meeting of the Fairs and Exhibition Association, the central body, of which the Superintendent of Agricultural Societies is also Secretary.

SEED AND STOCK SHOWS.

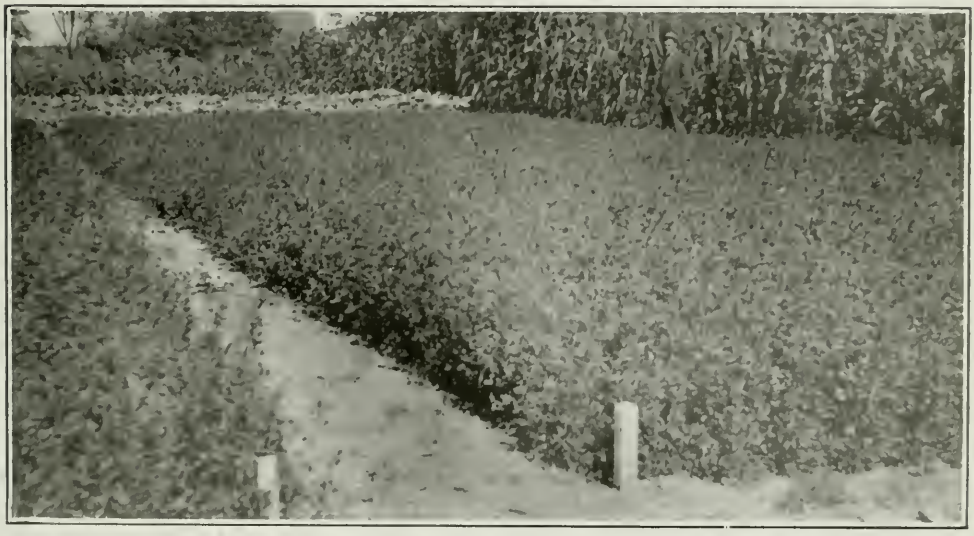
In addition to the fall exhibitions embracing live stock, grains, vegetables, fruits, dairy products, agricultural implements and manufactured goods, it has been found that good work could be done by specializing on certain lines. Hence seed fairs are held during the winter months and stock shows in the spring. A special grant of $500 is made to aid each of these lines of work. There has been a great increase of activity in both these lines in recent years, and during the past year 63 spring stock shows were held, compared with only 20 four years ago. There were 17 seed fairs, more than treble the number four years ago. Judges are, of course, sent out by the Department to these fairs on the same basis as to

the fall exhibitions. Nine of the societies confine their efforts solely to owning pure-bred stock, and seven others keep pure-bred stock and hold exhibitions as well.

FIELD CROP COMPETITIONS.

In 1907, a new development in the work of the agricultural societies was made by the inauguration by the Department of a plan for competition in crops growing in the field. It was felt that good work could be done not only by offering prizes for samples of grain, as is necessarily the case at fall fairs, but also by offering prizes for fields of grain as they stand on ripening for the harvest. To win such prizes would call for care in the selection of seed, study as to soil conditions and the proper time for sowing, and watchfulness to eliminate weeds pests. All these things must make for better grain growing.

An appropriation was made for this purpose and each agricultural society



Alfalfa experimental plot in Lanark County, where one fifth of the farmers are said to be growing this crop. This was grown without a nurse crop.

was given an opportunity to arrange for a competition among its members in one kind of grain. The Department agreed to pay $30 of the $50 to be offered in prizes by the society. The Department also agreed to appoint and pay the judges to make the awards. In addition to these prizes the winners of first, second and third in each society were eligible to compete at the Canadian National Exhibition, Toronto, with either sheaves or grain, the sum of $240 being divided in the sheaf competition and $128 in the grain competition, this money being contributed by the Exhibition Association. Further, they were eligible to be shown at the Winter Fairs at Guelph and Ottawa, where another $100 in prizes is offered.

The past year has given further proof of the success of the plan which has each year increased in favour. The record of growth to date is shown by the following figures:—

1907	10	societies	325	competitors	3,000 acres
1908	46	"	650	"	6,000 "
1909	77	"	1,200	"	20,000 "
1910	110	"	1,650	"	26,000 "

During the past year also a special effort was made to encourage the growing of alfalfa in the Province, and societies are allowed to compete in alfalfa in addition to one other kind of grain. A special prize is also offered.

As pure seed is one of the most important factors in the problem of increased production in grain growing, it has been found that these competitions have possibilities for usefulness beyond the local community in which they take place. The prize-winning grain at the Toronto, Guelph and Ottawa exhibitions becomes the property of the Department. It is divided up and distributed among the fourteen district representatives of this Department, who in turn distribute it among the farmers of their respective districts. In the fall, those who have received the pure seed return two bushels from their crop, and it is again passed on. During the past year this work has been extended by the purchase by the Department of the grain exhibited but not winning a prize at Toronto, for the purpose of distribution in Northern Ontario. Frequent complaints have been received to the effect that much of the grain sold to New Ontario farmers for seed purposes is inferior grades from the West, often including screenings or weed seeds. Hence this plan has been adopted as an experiment in endeavoring to combat the evil and remove in some small degree at least one of the handicaps under which the farmers of the North are labouring.

HORTICULTURAL WORK.

Five years ago the law was changed with respect to horticultural societies, giving them an identity and authority distinct from the agricultural societies. A society may now be formed in any city, town or village. The work has progressed

Three-year-old pine plantation on waste land in Durham County, planted under the direction of the Forestry Department of the College.

rapidly, and the end of the past year saw a total of 64 societies, with an aggregate membership of 10,000, the latter being double the number of five years ago. The central body representing these local associations is known as the Ontario Horti-

cultural Association, the Secretary of which is Superintendent of this Branch. To encourage this work, a grant of $10,000 was made during the past year, an increase of $2,000 over the previous year. It is distributed on a basis of the amount spent by each society for horticultural purposes, and works out at a little over a third of the total expenditure. The membership of these societies includes many public-spirited citizens who are doing good work towards beautifying the town or city in which they reside. In many instances meetings and exhibitions are held to impress on the people the desirability of making the most of the beauties of nature by which they are surrounded. In some towns lawn and garden competitions have been held with good results. The societies are now devoting considerable attention to the encouragement of school gardens, and assuredly much useful work can be done along these lines.

In the carrying on of all this work the societies are very materially aided by the department of landscape gardening at the Agricultural College, which has made a special study of civic improvement and school gardens.

EXPERIMENTS WITH TOMATOES AND POTATOES.

Along similar lines the Department assists and supervises the work of the Ontario Vegetable Growers' Association, which exists to further the interests of the vegetable growers of the Province. This central organization has a membership of 800, and there are 17 local organizations. An annual report and other useful information is distributed to the members.

The two special features of the work carried on during the past year consisted in important experiments with tomatoes and potatoes. An experimental shipment of tomatoes was made to the London, England, market. While on a trip to England the Secretary of the Vegetable Growers' Association, who is also Director of this Branch, noted that tomatoes from the Canary Islands commanded a ready market in Great Britain, although they had to be transported a distance almost equal to the distance from Ontario. They were packed in peat and sawdust, and arrived in good condition. Prices ranged from four cents to twelve cents per pound. A quantity of peat and sawdust was imported, and a shipment made from the Jordan Experimental Farm. They arrived in good condition, proving the possibilities of enterprise along this line. Before tomatoes are exported in commercial quantities, however, particular attention will have to be paid to several points, not the least important being the question of variety. Large, coarse tomatoes, like many of those grown in Ontario, are not acceptable in Old Country markets. The demand is for medium-sized, smooth varieties, like the Ferguson, which was one of the kinds shipped in the experiment.

An experiment as to the possibilities of Northern Ontario for potato growing was carried on. At present large quantities of seed potatoes are imported to Ontario from the United States and parts of the Maritime Provinces. In order, if possible, to develop a supply for seed purposes in our own Province, an acre was planted at the Government Demonstration Farm at Monteith. The yield was very satisfactory, and proved the vegetable-producing possibilities of Northern Ontario soil. The crop is now stored at the Ontario Agricultural College, and will be distributed in the spring through various agencies for seed purposes.

LIVE STOCK BRANCH.

Under this Branch is directed the work carried on in behalf of the live stock interests, including the Guelph Winter Fair, the Ottawa Fat Stock Show, horse and poultry shows, and sheep demonstration stations.

It has been decided that the live stock interests could best be served by a close relation between the Department and those connected with live stock throughout the Province. This provides for co-operation and concerted effort on the part of the Department and of those interested in live stock, in advancing the live stock industry of the Province. In carrying out this co-operative plan, the Director of the Live Stock Branch has acted as the executive officer of a number of live stock and poultry associations. These include the Ontario Horse Breeders' Association, Dominion Cattle Breeders' Association, Dominion Sheep Breeders' Association, Dominion Swine Breeders' Association, Ontario Sheep Breeders' Association, Ontario Yorkshire Association, Ontario Berkshire Association, and the Poultry Associations of Eastern and Western Ontario. These associations are incorporated and hold meetings annually for the purpose of discussing matters relating to the kind of stock in which each is specially interested. The routine work of each of these associations as well as carrying out suggestions which are adopted falls upon the Live Stock Branch, which also supervises the grants paid to promote horse shows, poultry exhibitions and other live stock enterprises.

WINTER FAIR.

The Winter Fair held annually at Guelph, while under the management of a Board of Directors appointed by the live stock associations is liberally supported by the Department of Agriculture, both by annual grants and by special grants to provide for accommodation. The last Show held was the first combined Show, including horses as well as cattle, sheep, swine and poultry. A special grant of $25,000 was given by the Government for the purpose of enlarging the Winter Fair building to give increased accommodation for the kinds of stock and poultry on exhibition previously and also to supply accommodation for judging and stabling horses. The result was eminently successful. The classes in all departments were well filled and in the horse department was larger than at any of the Ontario Horse Breeders' Exhibitions held in previous years. The entries totalled 6,260 while the prize money paid aggregated $12,040. The attendance too was much increased, the gate receipts being larger than the combined receipts at the Winter Fair and the Ontario Horse Breeders' Exhibition held the year previous. The course of lectures held in connection with the Show was well attended, and, as in other parts of the building, more accommodation could have been made use of had it been available. The time for holding the Show for 1910 has been increased one day, so as to distribute the attendance over a longer period and to provide more time for judging in the different departments, as well as for the lectures and addresses.

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW.

This Show, which is held at Ottawa, is related to the Department the same as in the case of the Winter Fair. During the past two years the Show has grown very rapidly. Classes for horses were added at that time, and since then it has been found necessary to increase the accommodation in this as well as other departments. At the present time there is in course of erection a new dairy stable

and lecture room, which, as well as providing more space for each of these departments, will allow of the other departments being extended. A grant is being given by the Government to cover the cost of the addition. That the Show and the course of lectures are appreciated by those in the eastern part of the Province is shown by the fact that the gate receipts for 1910 were very considerably larger than in 1909, while the gate receipts for 1909 were more than double those of any previous year.

SHEEP DEMONSTRATION STATIONS.

In co-operation with the Dominion Sheep Breeders' Association, this Branch has inaugurated a number of experiments, with a view to showing that a small flock of sheep is a profitable part of the average farm. For the carrying on of this work, nine farmers were selected, as follows:

Wm. Little, Brown's Corners	York County
Wm. Aitken, Windermere	Muskoka County
Wm. A. Creighton, Paris	Brant County
Marshall Dickie, Hyde Park	Middlesex County
John Pritchard, Redgrave	Huron County
Edwin Johns, Fairfield East	Leeds County
Donald C. Ross, Woodville	Victoria County
John McKee, Duntroon	Simcoe County
Isaac M. Kenyon, Perth	Lanark County

These places were selected as being typical of the conditions in the surrounding districts, so that the results might be of value to the entire district. It is believed that these different locations embrace practically all the different conditions to be found in the Province. The Department purchased a pure-bred ram for each experiment, and the flock is being handled in accordance with regulations approved by the Department. As the experiment is intended to cover a period of three years, there are no results as yet to report.

In the meantime, however, I take this opportunity of emphasizing the fact that there are many parts of Ontario which present exceptionally favourable conditions for profitable sheep-raising. During the past few years there has been a slight falling off in the number of sheep in the Province, whereas both the agricultural conditions and the market prices would seem to call for an increase. I trust that the splendid opportunities offered for the development of this industry will not be overlooked.

FARMERS' INSTITUTES BRANCH.

Under this Branch is directed the work of the Farmers' Institutes, Women's Institutes, Farmers' Clubs, Short Courses, Dairy Instruction and Inspection, Eastern Dairy School.

The Farmers' Institute is one of the best known of agricultural educational agencies. It has been in existence over twenty-five years. By the holding of meetings addressed by practical experts and successful farmers, it has been the vehicle through which much valuable information on farming subjects has been disseminated. The Farmers' Institutes are organized in districts, and there are now 101 in the Province, with a total membership of 21,662. There is a membership fee of twenty-five cents, and each Institute receives a grant of $25 from this Department, conditional on a like sum being voted by the County Council. This money is utilized for the holding of meetings and the payment of speakers. The arrangements for the dates of meetings and distribution of speakers are supervised by the Superintendent. During the past season 829 meetings were held, with an aggregate attendance of 108,020. There were 2,727 papers and addresses delivered. The members also receive regularly the reports and bulletins published by this Department. The tendency in institute work of recent years is to specialize, and hence, in addition to the regular meetings, there have been held during the season forty special institutes covering one to three days, ten special poultry institutes, thirty special seed meetings, twenty-five short courses in stock and seed judging. All were well attended, and there is no doubt but that much good was accomplished.

WOMENS' INSTITUTES.

As a separate organization, Women's Institutes date back thirteen years. For many years their progress was slow. It is only since 1905, when a special grant was appropriated for their assistance and encouragement, that they began to make rapid strides toward the strong position they now occupy. There are now 600 branches of Women's Institutes, with a membership of 14,000. These figures include local as well as district institutes, which explains how the women's organizations outnumber those of the men. Both, however, work along similar lines and under similar supervision and direction, with the exception, of course, that the women confine themselves largely to the problems affecting the home. During the past season the Women's Institutes held a series of 370 summer meetings, which were most successful. Altogether during the year about 5,000 meetings were held, with an aggregate attendance in the neighborhood of 136,000. A special feature of the work was the holding of 102 meetings in Northern Ontario, addressed by both a lady and gentleman speaker. While devoting special attention to the immediate interests of the home, they are now undertaking work for civic improvement, the establishment of local libraries, the encouragement of school gardens, and in one instance at least they have undertaken the erection of a local county hospital.

FARMERS' CLUBS.

Out of the Farmers' Institutes have grown the Farmers' Clubs, and these perhaps constitute the most notable development of the work at the present time. Trace of an organization known as a Farmers' Club can be found as far back as fifty years ago, but up to a few years ago the number was small. There are now

164 such organizations. They are more local than the Institutes, and hence get closer to the life of the farmer. They are mediums for the extension of social amenities and the development of individual talent, but it would seem their greatest usefulness has been along more practical lines than entertainment alone. Through them arrangements have been made for the carrying on of useful experiments in fertilizing, or in some other line of special interest to the district. Then, at the winter meetings, the results are imparted and discussed. They are being utilized more and more for the carrying out of plans of value to the district, and their usefulness is capable of being developed on many practical lines. In one district a Farmers' Club developed into a Fruit Growers' Organization; in others, their organized, united strength has been utilized to promote rural telephone

Explaining the care of orchards and the eradication of weeds at informal summer meeting of Waterloo County Farmers' Club, arranged by District Representative.

service for the district, to carry on co-operative buying of seed to secure purity and quality, to import seed corn on the ear, to import tile in carloads, to establish a variety of potatoes as a representative variety of the section, to run an excursion to the Agricultural College, to inaugurate a ploughing match, to encourage the growing of alfalfa. These are all practical lines of work, the benefits of which are obvious. The popularity of the Clubs gives basis for the belief that they will be important factors in developing the co-operative spirit in local districts, and must thereby ultimately have an influence on the Province as a whole.

MAY NEED CHANGE IN SYSTEM.

There are two striking facts in connection with all this class of work which call for serious consideration. One is the impetus given to the meetings, particularly to the organization of Farmers' Clubs, in those counties in which District

Representatives of this Department have been appointed, as described on another page. The other is the distinct tendency to do things rather than merely talk about doing them. This tendency is found in districts other than those which have Representatives, but the presence of a Representative supplies an energizing and directing force which accomplishes results. The tendency is illustrated in the organization of Farmers' Clubs, which undertake some specific work, such as the construction of a rural telephone line or the carrying out of some crop experiment, or in the short courses, which demonstrate to the sight the principles verbally expounded. I merely desire to point out that these developments call for thoughtful consideration, and may in the not distant future demand important changes in what is known as the Institute system, in order to realize the best results from the money expended.

IMPROVING THE DAIRY PRODUCTS.

The work carried on under this Branch in connection with the dairy industry includes supervision of the work of thirty-five instructors and two chief instructors, supervision of the work of the Eastern Dairy School, the Western Dairy School being now in connection with the Ontario Agricultural College, and now supervision of the registration of cheese factories and the granting of certificates to cheesemakers. In addition, there is the distribution of the Annual Report of the Eastern and Western Dairymen's Associations meetings, and other educational publications.

There are in the Province 1,177 cheese factories and 97 creameries. Of these, 212 cheese factories and 71 creameries are in Western Ontario, and the balance in eastern sections of the Province. The combined output in cheese and butter is valued in the neighbourhood of $17,000,000 annually. For some years the work of instruction was looked after by the Dairymen's Associations in Eastern and Western Ontario, respectively, and instructors sent only to those factories which paid a fee toward expenses, but this was not found entirely satisfactory. In 1906 the work was taken over altogether by the Government, and thirty-five men are now employed during the dairy season from April to November. The work is organized in districts, the western districts being in charge of a chief dairy instructor located at London, and the east a chief dairy instructor located at Kingston. The former is Secretary of the Western Dairymen's Association, and the latter is in charge of the Kingston Dairy School, the efficiency of which was increased during the past year by the addition of a cold storage plant. The work of the instructors has been to see that cheese factories and creameries were maintained in a proper sanitary condition, and that the best methods were adopted in the manufacturing. Reports indicate that there has been not only a distinct improvement in the sanitary conditions, but also a marked advance in the quality of the output. Their influence also extends to the producer, who is encouraged to adopt proper care in the handling of his milk, in order that it may produce better cheese. This educational work is also furthered by expert speakers at 360 factory meetings and 24 district meetings held throughout the winter, with a total attendance of 24,136. Supplementary to the work of the instructors, the Dairymen's Associations employ special inspectors during the summer months to detect and punish adulteration. The prosecutions instituted in this connection have had a salutary effect. The work is supported out of the grants made by the Department to the Associations. The Western Association receives $2,000, but the grant to the Eastern Association was increased from $2,000 to $2,500 during the past year.

And now another step is being taken. By the legislation of 1909 and 1910

it was provided that all cheese factories and creameries should register with the Department, and also that after January 1, 1911, all chief makers should possess certificates of competency based on a course at the Dairy School, or on experience as approved by an Advisory Board and the Minister of Agriculture. No fee is charged in either case, the object being merely to exercise a closer supervision over the places of manufacture and secure a higher rate of efficiency on the part of makers. The consequent improvement in the quality of the product should enable Ontario to increase the prestige already attained in the markets of the world and also increase the return to the individual dairymen. This new legislation is just now being put into effect.

District Representatives encourage cow testing and this herd of eleven grade cows in Lanark County, averaged 5,300 pounds in May, June, July, August, 1910.

FRUIT BRANCH.

Under this Branch is directed the work on behalf of the fruit-growing industry and the beekeeping industry. This includes the Horticultural Experiment Station at Jordan Harbour (Lincoln County), the co-operative societies, and the Fruit, Flower and Honey Show.

It is only during the past two years, since March, 1908, that these matters have been given the attention of a separate Branch. While much of its effort is directed towards encouraging fruit-growing along the best lines and combatting insects and pests, yet ever-increasing attention is being paid to the market end of the business.

In the combatting of insects, the usual inspection is made by officers of the Branch of the fumigation and packing houses. Generally speaking, however, there is local option in the enforcement of the Fruit Pests Act, the scope of which was enlarged at the last session of the Legislature. It was provided that municipalities may, or upon petition of twenty-five fruit growers must, appoint inspectors. The Government pays half the remuneration of these inspectors. During the past year fourteen municipalities took advantage of these provisions and eighteen local inspectors were appointed. In addition, a chief inspector appointed by this Department supervised the work as far as possible. Some complaints have been heard that while the inspection and location of infested orchards has been well carried out, there has been laxity in the enforcement of the provisions calling for the spraying or cutting out of infested trees. It should be clearly understood that responsibility rests on the local council and its inspector to see that this is done, and the local public opinion should strongly back them up in their work.

DEMONSTRATION ORCHARDS.

But perhaps the most important work carried on during the past year with a view to showing the commercial value of proper methods in orcharding was the demonstration work undertaken in Simcoe County. Although under the supervision of this Branch, it was personally directed by the District Representative in the county, assisted by two expert orchardists. The Georgian Bay district has been noted for the quality and high colouring of its apples, but of late many orchards have been neglected. Last spring six of these neglected orchards were taken over by the Department and were handled from before the buds opened until after the last apple had been sold. These orchards were located on main roads in different parts of the county, and the different demonstrations were well advertised, so as to be of benefit to a maximum number in the neighbourhood. The plan adopted was first to scrape off all the loose bark, which was done by the owner; then, just before the leaves began to show, the first spraying was done, which consisted of the "lime-and-sulphur" solution in the proportion of 1 to 10 of water; then followed the pruning; the second spraying was done immediately after the blossoms had fallen, and consisted of lime-and-sulphur, 1 to 40, and 3 lbs. of arsenate of lead to the barrel added. In all the orchards a few trees were left for demonstration purposes, these being pruned and sprayed in the presence of the farmers assembled, when appropriate explanations were given. In the first of the general sprayings the amount of solution used was about 4 gallons to the tree, and in the second spraying about 5 gallons to the tree. Only two sprayings were given, but the work was most thoroughly done.

The experiment, however, did not conclude until the apples were picked, packed and sold and the revenue counted, for it was recognized that no comment on the work could be quite so eloquent as when money talked. Apple growing is a commercial proposition, and modern methods of orchard culture must be justified on that basis. As is well known, it was what is known as an "off year" for apples, and the crop everywhere was light, but on the other hand prices were higher than usual. The orchards included many varieties of apples, Ben Davis, Astrachan and Snow predominating. They were carefully graded and packed and sold for $3.00 per barrel for fall and winter apples, and $2.50 for summer apples. Culls brought 60c. per barrel, and windfalls $1.25. When everything had been closed up it was found the receipts had been as follows:

Directing the attention of passers-by to the Demonstration Orchards.

Orchard of	No. of Trees	Gross Returns	Net Returns
W. Hamilton, Collingwood	192	$ 529 50	$ 405 40
Colin Campbell, Stayner	75	192 50	140 00
Robert Steele, Cashtown	33	45 00	33 75
John Osborne, Dunedin	50	311 35	232 97
W. J. Ovens, Duntroon	103	141 35	110 60
S. Blackburn, Creemore	80	108 00	86 25
	533	$1,328 10	$1,008 97

Making an allowance of 75c. per barrel for picking, packing and cost of barrel—a very liberal allowance—there was still a net profit to the growers of $1,008.97. This figures out at practically $2.00 per tree, and, counting 40 trees to the acre, means a net return of $80 per acre on the whole experiment. A net return which represents ten per cent. on an estimated valuation of $800 per acre—and no one would have dreamed of paying anything like that for some of these

acres before the demonstration was made—must be considered very satisfactory for a poor year. At $50 per acre, which might be considered a more reasonable valuation before the work was undertaken, the return would be at the rate of 160 per cent. This is a consideration of the orchards as a whole, and of course some turned out better than others. The best one was the Osborne orchard, where fifty trees yielded gross returns of $311.35 and net returns of $232.97. The highest previous return from this orchard was $50, and hence there was an increase of over 500 per cent. Another orchard which never previously yielded more than $30 netted $86.25.

It will be noted that no deductions have been made for the cost of the demonstration work. This amounted to $509.13, mostly on labour account, and even deducting this, there is still a good margin of profit. It has been thought, however, that such a deduction would be unfair for the simple reason that being demonstration work for the benefit of the community and the Province, it was somewhat more elaborate than would usually be the case. Moreover, the orchards

BEFORE. AFTER.

BEFORE AND AFTER PRUNING.

were in such a neglected condition that much of the work would not have to be done another year, and therefore could not properly be charged against one year's crop.

Every effort has been made to bring this demonstration to the attention of orchardists all over the Province. Aside from the exhibits made at the local fairs in Simcoe County, a large exhibit was presented at the Horticultural Show in Toronto and attracted much attention. Furthermore, apples from these orchards were entered by the owners in the competitive classes at the Toronto Show and they secured one first and two seconds on barrels, five firsts and three seconds on boxes and several firsts and seconds in other classes.

The moral of this is obvious.

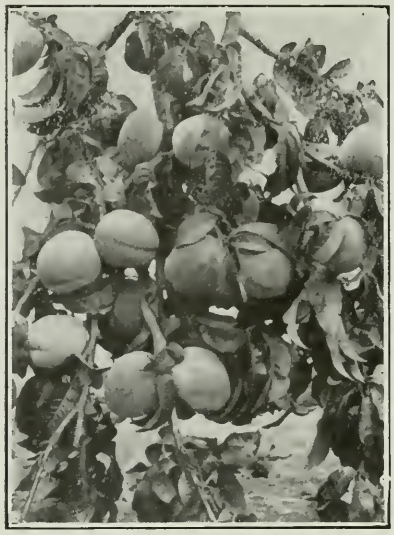
PEACH CROP WILL BE DOUBLED.

Surveys have been made during the past year to ascertain the condition and extent of the peach areas in the Niagara district, the apple orchards of Northumberland county and the fruit and canning factory crops in Prince Edward county.

Some striking and significant facts have been discovered. In the Niagara district it was found that while there are at present only about 375,000 trees in bearing, there are young orchards comprising approximately 500,000 trees. This means that in the next five years the production of this wonderful district alone will be doubled. But there is another feature worthy of special notice in connection with the peach industry, and that is the material extension of the peach area of the Province. Heretofore the Niagara district has had pretty much of a monopoly as far as Ontario is concerned of this tender fruit. During the past year, however, thousands of peach trees, estimated at nearly two hundred thousand, have been planted out in Norfolk, Kent, Essex and Lambton counties, where both soil and climatic conditions are considered favourable.

Ontario Peach Area is extending—Three-year-old peach plantation in Lambton County.

Then, too, reports received as to the result of surveys and from nurseries indicate similar activity in reference to other lines of the fruit industry. There is no doubt but that there has been great neglect in the past, and many orchards have in consequence been practically allowed to go to waste. These are now being taken hold of by progressive owners who have learned from such demonstrations as above outlined what can be accomplished by care and attention, or else by enterprising speculators who are anxious to profit by the owner's indifference. In addition, hundreds of new orchards are being planted out in all parts of the Province, and it is estimated that at least a million and a half young apple trees were added during the past year to Ontario apple orchards, which, according to the last census,



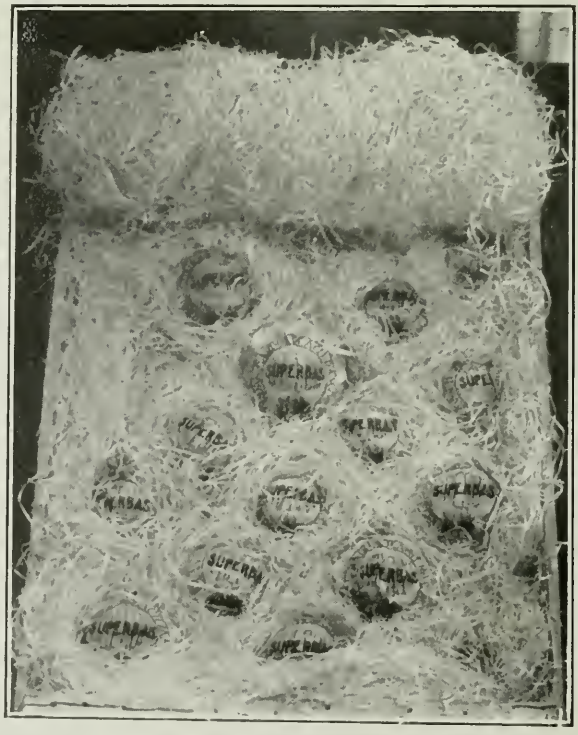
Elbertas on the Tree.

included ten million apple trees. This increase is many times the normal planting. The number of other fruit trees planted during the year is placed as follows: Pears, 215,000; cherries, 279,000; plums, 268,000; grapes, 115,000.

ONTARIO LEADS IN LONDON.

If the production of our peach orchards is to be doubled in five years and the output of other orchards is to correspondingly increase, it becomes urgently important that increasing attention be paid to the matter of markets and the facilities for and methods of marketing.

From this standpoint and having regard to future possibilities, special importance may be attached to the work of the past year in placing Ontario peaches on the British and European markets. But whatever future developments may be, it is gratifying to state that this Department was instrumental in placing the first large consignment of Canadian peaches on the commercial markets of the Old World. In view of the fact that it was only a few years ago that there was great timidity about shipping tender fruits as far as Winnipeg, it can readily be understood that attempting to send peaches across the ocean was not without its hazards. However, it was decided in the fall of 1909 that an experiment should be made. Accordingly a private consignment was then forwarded to our London Agent and it arrived in satisfactory condition. This was a basis for the belief that shipments might be carried on this year on a commercial basis, and arrangements were made with this end in view. In the meantime, the Dominion Department of Agriculture also decided to undertake shipments. We had a sample case of South African peaches sent over



Elbertas packed at the Fruit Experimental Farm, Jordan Harbor, for shipment to the British Market, September, 1910.

here in order to study their methods of packing for a long journey. Then we imported a ton and a half of very fine aspen wood wool, of a grade not manufactured here. A portion of this was supplied to the Dominion Government for packing, and personal expert assistance was also extended to them in their work of packing, which was carried on at St. Catharines. As to the strictly Ontario Government shipments, this Department undertoook to supervise the picking, packing, cooling and shipping and have our London Agent look after the selling. Mr. Dobson, of Jordan Harbor Peach Ranch, supplied the peaches, and the cold storage plant at the Jordan Horticultural Experiment Station was utilized. Special cases were made to carry from fifteen to twenty-four peaches. The beautiful fruit, wrapped in fine white paper and packed in the white aspen wood wool, made a very attractive parcel. The first shipment arrived in England on September 20th, and other shipments followed at intervals until near the end of October. Crawford and Elbertas were the leading varieties exported. They were placed on sale at the following places:

Berlin, Germany	Newcastle, England	Torquay, England
Hamburg, Germany	Birmingham, England	Glasgow, Scotland
Brussels, Belgium	Leamington, England	Dundee, Scotland
Manchester, England	Hull, England	Edinburgh, Scotland
Liverpool, England	Bradford, England	Dublin, Ireland
Leeds, England	Bristol, England	Belfast, Ireland

Altogether under the direction of both Governments there went forward 3,500 boxes of peaches. The wholesale price ranged from four to six shillings per case, which is sufficient for a substantial profit to Ontario growers. The retail price was from five to six pence per peach, while some sold as high as a shilling per peach.

But while these initial shipments have proven a success, the business of exporting peaches on a commercial basis at a fair profit is by no means solved. To get a firm footing on the British or foreign market will require much work and study, but it is an opportunity which might well challenge the enterprise and progressiveness of Ontario growers. It can, of course, be undertaken only by large growers or co-operative associations who have proper plants for packing and cooling the fruit before shipment. It will also have to be recognized as a fundamental principle that only perfect fruit carefully picked and properly packed will command attention. Undoubtedly the mere placing of Ontario peaches on the London market has done much to advertise the fruit growing possibilities of the Province, and I am confident that strict adherence to the paramount importance of quality in handling this trade in future will result in profit to the growers and credit to the Province.

BIG MARKET IN THE WEST.

Largely with this same idea of fostering markets, exhibitions of fruit have been made at Winnipeg and Toronto Shows.

The Winnipeg Exhibition, which takes place early in July, has proven a useful opportunity to present the merits of Ontario fruit to the western market. British Columbia also had an exhibit in the same building, and has during the past year put forth strenuous efforts to capture the fruit trade of the prairie Provinces. The thousands who visited the Ontario exhibit evidenced the popularity of the fruit from this Province. The fact is that attention to quality and to the proper methods of packing are now the chief requisites if Ontario is to retain and increase her trade with the West.

The feature of the exhibits at the National Exhibition, Toronto, and at the Ontario Horticultural Show was the great strides made in regard to box packing of fruit. After seeing the exhibit at the Canadian National, one Toronto dealer placed an order with a co-operative organization for 1,000 cases of peaches in boxes and 50 cases of pears in boxes. This is the largest order for Ontario fruit in boxes for local consumption placed up to that time. Then, at the Horticultural Show there were 1,200 boxes of fruit on display, compared with only 300 last year. Remembering that only seven years ago there were only twelve boxes on display and not one of these was judged to be properly packed, the progress made must be regarded as remarkable. Remembering also that careful and attractive packing is one of the fundamentals for the success of Ontario fruit on both local and outside markets, the progress made cannot be regarded as other than gratifying.

Interested gathering of farmers in one of the Demonstration Orchards learning how spraying should be done.

BENEFITS FROM CO-OPERATIVE MOVEMENT.

Assistance is rendered by the Fruit Branch in the organization of co-operative fruit growers' associations, and to a limited extent in their management after organization. During the past year, the Department was called on for aid in several districts, and as a result three new co-operative organizations were formed, and the outlook would indicate that many more will be started during the coming year. At present there are thirty-six co-operative fruit associations, with one central association combining representatives of all. They are in all stages of development. A few are struggling and have not yet realized the purpose for which they were organized, while others are strong and vigorous and have memberships in the neighborhood of 400. Generally speaking, it seems to be the fact that where there has been strong, energetic and honest management, the co-operative association has been a distinct and continual boon to the district in which it has worked. Usually the growers begin by co-operating in the purchase of spraying

and other materials for the orchards. Buying in carload or other wholesale quantities results in reduced cost to the individual. Having made a success of this, they take the next step and pack and sell their fruit co-operatively. Selling in a large way to big dealers enables them to get the maximum market price, which means increased returns to the individual. Then there is the important consideration that all this demands special attention to the question of quality that a high standard be maintained by all alike. There is no doubt but that successful co-operative associations in several counties have been important factors in doubling and trebling the values of orchard lands, and thereby enhancing the value of farm lands in general. I am convinced that sane, practical co-operation will be found to be of inestimable value in the continued development not only of the fruit industry, but in other lines of agriculture as well.

FRUIT FARM AT JORDAN HARBOR.

In 1907, when the Government was seeking a site for an experimental fruit farm in the Niagara district, Mr. M. F. Rittenhouse, of Chicago, a former resident of the district possessed of much public spirit, offered to present to the Department one hundred acres bordering on Lake Ontario at Jordan Harbor. This generous offer was accepted. Plans were at once made to develop an up-to-date experimental fruit farm, and I am now glad to say that these plans are nearing realization. Practically all the necessary buildings have been completed, including superintendent's residence, administration building, cold storage plant, canning factory, five small cottages for laborers, stables and other outhouses. Thirty-one acres of the land have been planted out with fruit trees, while the balance is being utilized for vegetable and truck crop experiments. Of the thirty-one acres planted, four and a half are occupied by a matured apple orchard, which yielded during the past year at the rate of about $300 per acre; eight and a half acres by apple trees not yet in bearing; another nine by peaches which are expected to come into bearing next year, and the balance as follows: four in pears, two and a half in plums, two in cherries, half an acre in grapes.

Then there is a separate department for plant breeding work. At present 30,000 seedling strawberries are under test with a view to producing a variety of higher flavor and better shipping qualities than possessed by any of the present known varieties. Similarly in regard to peaches an experiment is being carried on to produce a peach of the fine flavor and eating qualities of the Early Crawford and at the same time the shipping qualities of the Elberta. The constant aim is the raising of the standard of quality.

Apiary work has also been carried on at the farm, and our experience shows the profits to be made out of this side-line of the farm. In 1909 twenty-five colonies were purchased at $8.00 per colony, an outlay of $200.00. These increased to thirty-eight colonies and yielded 1,750 pounds of honey, which sold for $175.00. Thus with the increase in capital account represented by thirteen new colonies the first year's returns were at the rate of over 100 per cent. on the investment. In the spring of 1910 twenty colonies were moved to the Ontario Agricultural College at Guelph as a nucleus for their experimental apiary. These increased to thirty-four colonies, and yielded 600 pounds of honey, representing $60.00. The eighteen remaining at Jordan increased to twenty-five and yielded 1,000 pounds of honey, representing $100.00. There is still some honey not extracted both at Jordan and at Guelph. Thus in two years the original investment of $200.00 has returned $335.00 in cash and the original twenty-five colonies has become fifty-nine colonies.

One of the 181 matured apple trees at the Jordan Harbor Fruit Farm. This orchard, covering 4½ acres, yielded during the past year, at the rate of $300 per acre.

These figures, of course, constitute the gross returns, but it is easy to see the handsome profits they represent. Ontario's product already enjoys a splendid and increasing market in Northern Ontario and Western Canada and plans for placing it on the English market are now under consideration. At present the annual output represents about three-quarters of a million dollars, and this could be materially increased.

In the supervision of the work of the Farm, the Director of the Fruit Branch has the assistance of an Advisory Board of practical and successful fruit growers from all parts of the Province.

While on this subject, I might add that during the past year the Department was successful in having the Grand Trunk Railway erect and open a station on its line at Vineland, a mile from the Farm, serving the large district between Beamsville and Jordan Harbor. The necessity for this station and its great usefulness are attested by the fact that although it has been open only one season, a hundred feet of additional platform space has had to be provided in order to accommodate the large shipments of fruit made from that centre.

INSPECTION OF BEES.

The work of inspection of apiaries carried on under the supervision of the Fruit Branch is entirely a development of the past few years. During the past year sixteen inspectors were appointed during the season of four or six weeks. This was an increase of three over the previous year and of fifteen over four years ago. In addition, their work was supplemented by the services of a permanent chief apiarist in connection with the Ontario Agricultural College at Guelph, to which place a portion of the experimental apiaries have been removed from Jordan Harbor. The efforts of the inspectors were directed to stamping out European foul brood in districts not previously inspected, and to giving advice on the best ways of combatting bee diseases. Considerable progress is reported in combatting foul brood in the districts visited, but reports also indicate that the disease is still virulently prevalent in other districts. An effort will be made to reach some of these next season.

EXPERIMENTAL WORK WITH BEANS.

At the request of the bean growers of Kent County, the Fruit Branch during the past year undertook experimental work with this crop. Growers and dealers having united in declaring that the quantity of beans per acre has been decreasing, steps were taken to ascertain whether this was due to lack of care in seed selection or to improper fertilizing. At the same time an educational campaign was launched. A meeting was held in Ridgetown and prominent bean growers and buyers from the United States and Canada delivered addresses. About 300 were present and an Association, known as the Ontario Bean Growers' Association, was formed to look after the interests of the industry and to act with this Department in pushing the business. There are many evidences that an impetus has been given to the industry, but its extent cannot yet be measured.

DISTRICT REPRESENTATIVES.

By the appointment of six local district representatives in the summer of 1907, this Department adopted a new policy for the purpose of improving agricultural methods and conditions. Looking back over the development of this policy since that time, and particularly during the past year, we have a story that is full of past achievement and of future hopefulness.

The object in view was to impart agricultural instruction in the High Schools that the rising generation might be trained for farm work; and at the same time to bring the most up-to-date agricultural information to the very doors of the farmers who had not had an opportunity of acquiring it in their youth. Accordingly the policy was worked out jointly by the Department of Education and this Department. It was arranged that the Department of Education should pay the salary of $1,200 per year, that this Department should bear the cost of assistance and

Cabbages growing in experimental plot in Dundas County, yield being 27.5 tons of green fodder per acre.

general expenses, which experience has shown amounts to about $1,000 per year per representative, and that the local county council should be required to contribute $500 annually towards equipment. Arrangements were made to establish courses in agriculture on a par with the courses in English, classics, mathematics and science. It was finally decided to start the experiment in the high schools located at the following six centres:—

Lindsay, Victoria County.
Perth, Lanark County.
Morrisburg, Dundas County.
Galt, Waterloo County.
Collingwood, Simcoe County.
Essex, Essex County.

Each teacher selected was a graduate of the Ontario Agricultural College. As of course there was not a class ready to be taught at the outset, it was considered advisable that the teacher should do outside work to get acquainted with the farmers and the local conditions. Hence, in addition to being appointed a teacher on the high school staff under the jurisdiction of the School Board and the Department of Education, he was appointed officially as a representative of this Department for that district. An office was opened in the town and equipped with agricultural publications and other requisites. It was intended that this office should be a central, convenient place where the farmer could drop in and discuss his problems with a man who had given those problems special study. It was desired that it should be a place where the farmer could have access to the latest bulletins or periodical publications on agricultural topics. It was designed that it should be a meeting place for committees or officers of farmers organizations—in a word, the centre from which should radiate all the organized agricultural activity of the district. All these expectations have been fully realized in experience. The work has now developed to the extent that there are fourteen of these representatives in fourteen different local centres, including three appointed during the past year. Each one of them has an assistant, also a graduate or third year student of the College. In addition to the six places named above, they are located at the following centres and serve the county districts named, the last three places having been added during the past summer:—

Picton, Prince Edward County,
Whitby, Ontario County,
Carp, Carleton County,
Simcoe, Norfolk County,
Norwood, Peterborough County,
Petrolea, Lambton County,
Port Hope, Durham and Northumberland Counties,
Stirling, Hastings County.

LONG LIST OF SERVICES PERFORMED.

In reviewing the working of this plan, I must naturally confine myself to the work under the direction of this Department—the work done as district representatives. I have received reports covering the work carried on at each place during the past year. Some idea of the extent and variety of their work may be gathered from the simple statement that during the year the district representatives have performed the following functions:—

Organized and conducted three day short courses in live stock, fruit growing, seed selection;
Organized Farmers' Clubs;
Supervised Farmers' Clubs;
Managed excursions to agricultural colleges;
Made drainage surveys for farmers of the district;
Conducted drainage demonstrations for farmers;
Handled experimental plots to show value of drainage;
Started many agricultural societies in field crop competitions;
Helped organize horticultural societies;
Conducted experiments in fertilizing;
Conducted stock judging competition for boys at fall fairs;
Held seed and weed meetings in the interests of pure seed;

Made exhibits at fall fairs showing results from sprayed and unsprayed orchards, showing how to combat insects and weeds, and how to operate spraying apparatus;

Distributed bulletins at office and at fairs;

Conducted experiments with insecticides and fungicides;

Addressed nearly all Farmers' Institute meetings of districts;

Addressed nearly all Women's Institute meetings of districts;

Took personal charge of orchards in the district and demonstrated the commercial value of care and scientific methods;

Experimented, with good results, in growing broom corn;

Acted as judge at fall fairs;

Demonstrated the value of good fruit packing at fall fairs;

Attended most meetings of Farmers' Clubs;

Addressed Fruit Institute meetings;

Made survey of waste land in district;

Conducted experiments in spraying weeds;

Used office as meeting place of farmers' organizations;

Organized egg circles in two counties;

Handled large correspondence at office, giving farmers information on all subjects of interest;

Helped farmers save money by buying materials on the co-operative plan;

Acted as manager of agricultural society;

Encouraged and assisted farmers in conducting experiments on their own farms in the lines for which there was a good local market;

Assisted in making plans for farm buildings and ventilation;

Gave information and assisted farmers in removing smut from wheat;

Helped the work of cow testing;

Obtained good results from experiments on muck land;

Encouraged growth of alfalfa to the extent that in one county one-fifth of the farmers have started growing it;

Interested rural public schools in agricultural competitions and in gardens;

Addressed Teachers' Conventions;

Contributed to local press in dissemination of useful information;

Organized a large Provincial Corn Growers' Association;

Conducted competitions in corn growing in rural schools of districts adapted to this line of farming;

Interested public school teachers in imparting agricultural information to their pupils.

Used office as a general bureau of information for farmers of the district.

ADAPTING WORK TO LOCAL CONDITIONS.

I do not desire to convey the impression that each representative performed each and all of the services thus enumerated. It is true that they all did work along almost all of the different lines. But the point I wish to make clear is that each and all performed as many of the above services as the necessities of the local conditions demanded or permitted. I do not hesitate to say that the past year proves that the plan has been successful, and will be successful because it so readily adapts itself to local conditions.

The agricultural problem is just a great collection of individual problems. There are certain general principles which apply to all, and in the working out

of these general principles there is scope in almost all sections for work along the lines of short courses, drainage, institutes and so forth. But in the final analysis the solution of the general problem seems to be in the practical application of the general principle to the specific individual problem. Ontario is a large Province possessing a great difference in soil conditions, in climatic conditions, in transportation facilities. Ontario's agricultural problem, therefore, must be worked out in full recognition of these important facts. To attempt to do this solely by means of a central department or a central college is inadequate. Our experience thus far goes to show that it can best be done by placing a graduate of the College as a permanent resident in each county with instructions and facilities to study local conditions and apply to local problems not only his own knowledge and energy, but also all the resources of this Department, including, of course, the Ontario Agricultural College.

District Representative giving Mustard Spraying Demonstration in Simcoe County.

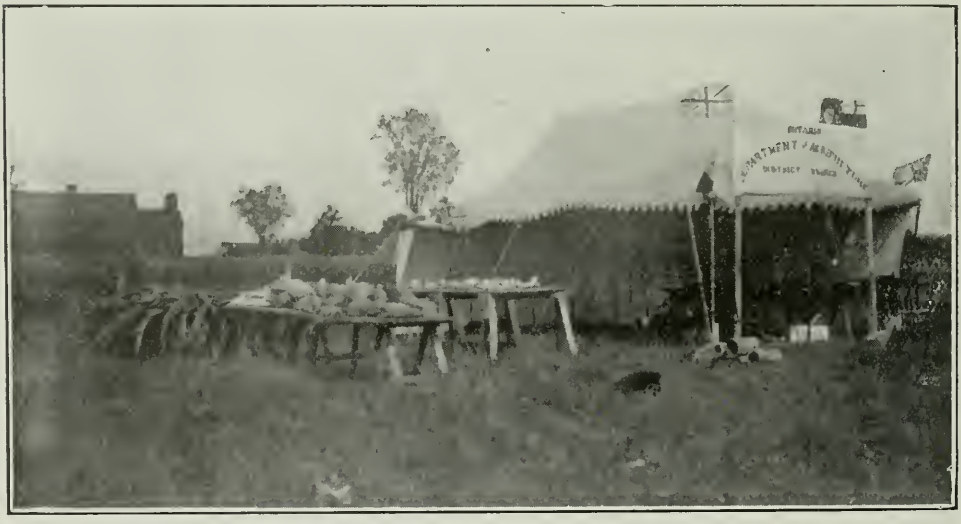
And that is a point worthy of special emphasis. The element of the personal contact between the representative and the local farmers helps to crystalize all the other work of the Department. It gives to bulletins and other useful publications a new meaning. It gives a new impetus to Farmers' Institutes, Farmers' Clubs and Agricultural Societies. But above all, it serves to direct agriculture along those particular lines for which the district is best suited, and in these days of specializing that is bound to become an ever-increasingly important feature of successful farming.

SOME CONCRETE RESULTS.

To show that all this is not fine theory, but is capable of practical proof, I beg to cite a few concrete results from the work of the representatives. Reference has already been made to the success of the demonstration orchards conducted jointly by the Fruit Branch and the district representative in Simcoe county. Similar results, showing the benefits of practical work in the orchards, are reported from many other sections of the Province.

In Dundas county the representative and his assistant took charge of four orchards and directed the care of another. In one orchard of 43 trees, covering one and one-third acres, there was a yield of 143 barrels, which netted to the owner $400 on the trees. A row of unsprayed trees was left in the centre of the orchard and these five trees yielded only seven barrels, of which only one was No. 1. The spraying material cost $7.90. In another orchard, four miles distant, fourteen McIntosh trees and sixteen Fameuse trees yielded $350 worth of fruit, while the product of another demonstration orchard was purchased by the Dominion Government for exhibition at the World's Fair, Brussels. These and like results obtained in the other two orchards were in striking contrast to the small and inferior crops yielded in unsprayed and uncared for orchards of the same neighborhood.

In Norfolk county it was found that 300 farmers had already adopted spraying and so efforts were directed along the lines of showing how to spray thoroughly, systematically and at the proper time. The same line was followed in Prince Edward where 200 had adopted spraying.



District representatives carry on their educational work at the fall fairs.

One of the many orchards visited in Essex and Kent had been in sod twelve years and had been pruned but little. Although it was badly infested with San Jose scale, it was pruned, sprayed and kept cultivated during the summer. The result was the only marketable crop of apples ever grown by the orchard, 75% being No. 1. They took first prize at many of the fall fairs and the surplus was sold at $1.00 a bushel.

CO-OPERATIVE POULTRY CIRCLES STARTED.

Probably one of the most important developments of the past year has been the organizing of co-operative poultry circles on the lines of the Danish co-operative movement. The first of these organizations in Ontario was launched in Peterborough through the efforts of the district representative working in conjunction with Prof. Elford of Macdonald College and the Poultry Producers' Association of Canada. There are now six of these circles in the county and others are being formed rapidly.

The object of these poultry circles is to increase both the quantity and quality of the output, and the incentive is an increased price. Each member is guided by certain simple rules, as appended below. He is given a number which is stamped on all his eggs before they are forwarded to the central gathering station at Peterborough city. There they are candled, graded and shipped by express to Montreal. The price paid each member is determined by candling, which means it depends on the quality. Thus far first-class eggs have commanded from two to five cents above market price and some have sold as high as sixty cents a dozen. Stale and broken eggs bring about ten cents a dozen less, while rotten eggs are not considered. A bonus of one cent per dozen is paid for cases of absolutely No. 1.

At the central candling station there is also an expert plucker who kills and dresses the fowls for market.

Following are the rules governing the circles:

1. Each member should bear in mind that the aim of the Association is not only to get better prices but to raise the standard of poultry produce, and make the trademark an absolute assurance of quality.

2. All produce of a member must be shipped through the central depot, except what is required for home use, and each package must bear the trademark, grade and number of the branch.

3. Each member must mark his produce with trademark supplied, and the Superintendent's ruling in regard to quality shall be considered final.

4. Male birds are allowed with the flock during breeding season only, and in no case later than June 1st, when they must be killed or otherwise disposed of.

5. Only artificial eggs may be used for nest eggs. Eggs must be gathered at least twice a day and kept in a cool room free from draught, dampness or any foul odors, and of a temperature not to exceed 60 degrees.

6. Eggs must be delivered to the central station at least twice a week in warm weather, and at least once a week in cold weather.

7. No eggs older than four days in warm weather, and seven days in cold weather, may be delivered.

8. Only clean eggs may be delivered, and they must be kept protected against the sun, rain or frost, by the members as well as by the collector.

9. Members may deliver only produce produced by their own flocks and allow their premises to be inspected by the Superintendent at any time.

10. Poultry houses or yards considered unsanitary, or containing diseased flocks will be excluded from contributing through the circle.

A similar line of work is being carried on by the representative in Ontario county, where two circles, embracing seventy-five members, are at work.

ORGANIZED CORN GROWERS' ASSOCIATION.

The story of the organization and work of the Ontario Corn Growers' Association may also be told as a result of the work of the district representative in Essex county. Whereas corn is one of the great crops of the United States, Ontario

produces a little less than 25,000,000 bushels of husking corn and a little less than 4,000,000 tons of silo corn. Approximately half of the husking corn of the Province is grown in the adjoining counties of Essex and Kent, while the neighboring counties of Middlesex, Elgin, Lambton and Norfolk account for another thirty per cent. of the total. In view of the fact that Ontario's crop falls about 11,000,000 tons short of the demand and that this amount had to be imported annually from the United States, including the corn for seed, there seemed to be big scope for developing this industry, especially in that district.

In 1908, a corn growers' meeting was held, and at it the Ontario Corn Growers' Association was formed through the efforts of the district representative, who became secretary. The new Association decided to carry on an educational propaganda in various ways, to secure better methods of selecting and caring for seed corn and to awaken new interest in the industry. One indication of their success is in the fact that while there were only 123 exhibits at the first exhibition,

Alfalfa, Rape, Tomatoes, Tobacco, Sugar Cane and Corn in a Demonstration plot in Essex County.

there were 800 exhibits at the exhibition during the past year, and a total attendance of 4,500. They also aim, by developing high quality, to supply the seed corn for the Province instead of having it brought in from across the line. Their success in this regard is indicated by the fact that it is estimated that during the past year 100,000 bushels have been shipped from this district to other parts of the Province compared with not more than 10,000 bushels a few years ago. In addition, quantities have been sent to all the district representatives for experimental purposes. The Association has a membership of 600, each studying seed selection and planting and proper methods of cultivation in order to produce the best results. Many individual cases have been reported where farm values have materially increased, in some cases doubled, as a consequence of the work carried on. The Association has been aided during the past year by a grant of $500 through this Department in addition to the publication of an annual report containing information of much value to corn growers.

SHORT COURSES AND DEMONSTRATIONS.

"Short Courses" is the name given to a practical education plan carried out by the representatives under the supervision of the Institutes Branch. They take place during the winter and occupy two, three or four days. During that time sessions are held morning, afternoon and night, and practical talks are given by experts from Guelph or elsewhere on horses, cattle, seed judging and kindred subjects. These talks are emphasized by ocular demonstrations. If the subject is horses, then a horse is brought into the ring and the good features and weak features pointed out. Then questions are asked and answered and a practical discussion follows. Although it is only three years since the first short course was held in the Province, they have grown in favour and usefulness so rapidly that some twenty-five were held during the past year and were attended by over 10,000 farmers.

Great demands have been made on the representatives for assistance in drainage, and 250 surveys have been made by them. These have invariably been followed up by the laying of tile and a resultant improvement in crops.

Here an expert is showing what to look for in a good horse.

Here is being shown how to pick out good and poor dairy cows.

SHORT COURSE WORK IS PRACTICAL.

Demonstrations have been given in the treatment of wheat for smut and experiments of various kinds have been carried on in all counties. In Essex, by the application of fertilizers, an acre of previously worthless muck land produced twenty-two tons of celery, which yielded a gross return of $363.20. The cost of production was $121.70, leaving a net profit of $241.50 per acre. Another plot without fertilizer yielded eight tons less. In Waterloo county fertilizer experiments were conducted on 30 different farms. In Prince Edward county over fifty different farmers have been engaged in fertilizer experiments in the growing of corn, barley, tomatoes, celery, potatoes, and strawberries, and the results will be discussed at the Farmers' Clubs during the winter. In Norfolk county wild mustard was killed by being sprayed with bluestone, while in Simcoe county bluestone was found to be not so effective as iron sulphate, which killed all the mustard plants without injuring the grain.

In some of the counties, notably Waterloo, Essex and Hastings, special attention is being paid to the rural public schools. In Waterloo, half a dozen schools have been interested in growing farm crops and making nature collections. The

pupils were given seeds to take home and sow according to directions. They cared for and harvested the crop. Prizes were given for the best results at a rural school fair. In almost every township of Essex and Kent a Corn Fair was held in the schools, and in many instances there were as many as one hundred exhibitors.

INCREASE IN LAND VALUES.

In addition to these specific results from the work of the representatives, there has also been a general increase in land values in the districts where the work has been done. This is especially true in reference to orchard lands.

COLONIZATION AND IMMIGRATION.

Under this Branch is directed the work of securing and placing settlers, farm labourers and domestic servants, including the work of the London office; and also the Demonstration Farm in Northern Ontario.

This Branch was transferred from the Department of Lands, Forests and Mines to this Department in 1905. Although immigration properly appertains to the Federal Government, which spends over a million dollars annually for this purpose, it has been found that this work has resulted mainly, though perhaps inevitably, in populating the Western Provinces. It has, therefore, been found imperative that Ontario should not only maintain an immigration bureau but increase its efforts to keep the opportunities of the Province before the world. At the same time the Bureau confines its efforts to the needs of rural Ontario, which has felt the lure of the West and the world-wide drift toward the cities. Aside from domestic servants, encouragement is offered only to those willing to go on the land either as settlers or farm labourers.

For many years the only Ontario office in Great Britain was located in Liverpool. In 1908, however, it was decided that the work in the Old Land could be directed better from London, and so in that year an office more in keeping with the importance of the Province and more fitted to disseminate a knowledge of its unrivalled opportunities was opened at 163 Strand, London. On Dec. 31, 1909, the Liverpool office was closed. The results from the London office have amply vindicated its existence. It serves as the basis for all the propaganda work on that side of the water. It keeps in touch with the "booking" agents, who are an important factor in emigration from Great Britain. It plans the work of the special agents sent over to visit the rural districts to proclaim Ontario opportunities. It has distributed a million pieces of Ontario literature and has kept the British press informed on Ontario matters. But the usefulness of the London office has not been confined alone to inducing and selecting emigrants. It has, during the past year, answered thousands of enquiries in regard to investment openings in this Province and has undoubtedly been influential in directing capital to Ontario to an amount estimated at over a million dollars. Moreover, in addition to keeping Ontario prominently before the thousands who daily pass along the Strand, one of the busiest thoroughfares in the world, it has been a great convenience to Ontario visitors to London. The record of callers of all classes shows a total of 13,257.

In addition to general supervision of the work of the London office, the local bureau has responsibility for making the plans and working them out. It has proceeded in recognition of the truth that lack of men to till the soil is one of the greatest handicaps to the full development of the agricultural wealth of both the old and new parts of the Province. A couple of years ago it was thought that the Province should leave the distribution of immigrants entirely to the Federal authorities. This did not prove very satisfactory, and so the work was resumed during the past year and an office opened at 172 Front Street, West, Toronto, in order to be in convenient communication with arriving immigrants. Farmers forwarded applications for help and these applications were filled so far as men were available. It has been found that this reduces to a minimum the danger of sending immigrants to places which have already been filled. Then, too, an energetic advertising campaign has been carried on to show the opportunities that

exist both in Old and New Ontario. In this connection two new pamphlets have been issued, one dealing with New Ontario and the other entitled "Dairying in Ontario," besides further editions of the handbook and folders issued in 1909. Of the folder 75,000 were issued in each of the English, French and German languages and 50,000 in Danish. Of the handbook, 30,000 copies were issued: of the dairying pamphlet, 50,000; Northern Ontario, 50,000, and maps of Ontario, 90,000. These are being largely distributed in the Old World.

RESULTS OF THE YEAR'S WORK.

It is extremely difficult adequately to set forth in official figures the results of this work. Much of it is educational and much of the seed sown during the past year will bring forth fruit in future years. Then there is a general trend of immigration which cannot be counted. It is certain, however, that the work of this Branch has doubled in the last year and a half and some figures may be given which indicate general results.

The following figures are taken from the records for the fiscal year from November 1st, 1909, to October 31st, 1910:

Total number of immigrants sent to farms by Bureau of Colonization	1,757
Number of farm labourers sent to farms by Salvation Army	1,758
Number brought to Ontario by Salvation Army other than farm labourers	2,718
Number of domestics placed by Salvation Army	281
Number of domestics given 24 hours accommodation at Women's Welcome Hostel and afterwards placed as domestics	742
*Number of domestics brought out and placed for whom a bonus of $5.00 each was paid:	
†J. W. Rigby	62
North of Scotland Bureau for Colonial Employment	72
Women's Domestic Guild of Canada	250
T. McGillivray	3
	7,581

Altogether, therefore, there is a record of 7,581 persons having been added to the population during the year, but it is safe to say that several thousand others have come into the Province though their names do not appear on the books of either the Bureau or the Army.

The notable feature in connection with the year's work has been the beginning of an experiment in advancing part passage money for farm hands and paying a bonus for domestic servants. Money for this purpose was provided at the last session of the Legislature. This action was based on the belief that there are many in Great Britain eager and competent to fill positions on Ontario farms or as domestic servants, but lacking the money for their passages. Conditional on agreements to accept work as farm labourers or domestic servants, it was arranged to advance $20 towards the passage money. Furthermore, in the case of domestics

* Bonuses have since been applied for in connection with a large number placed previous to October 31st.

† These were placed through the Women's Welcome Hostel, and hence this item is not counted in the total, as it would mean counting it twice.

it was agreed to pay a bonus of $5.00 each, in view of the care necessary in bringing them out and in looking after them upon arrival. Loans to the extent of $11,334.50 were paid under this arrangement, $5,400 being through the Salvation Army. Already nearly 75% has been paid back or is in sight, while the balance will be either paid in or properly accounted for in due time. Our experience has shown that where careful enquiry and selection are made regarding those to whom loans are advanced, a most satisfactory class of farm labourers and domestic servants can be secured for the Province. In fact selection is the big point in the problem. Every effort has been made to guard against carelessness and unscrupulousness, and while some misfits are inevitable, we believe we have kept the number to a very small percentage during the past year. Some of those who came out as labourers have taken up land, finding the comforts of the older settled parts more congenial than the rougher conditions of the new sections of the north or the west.

OPPORTUNITIES IN NEW ONTARIO.

A great deal of attention has been devoted during the past year to Northern Ontario. In this connection the Bureau has worked in co-operation with the Commission of the T. & N. O. Railway, the great colonizing factor in that new district. Publicity has also been given to the splendid opportunities in agriculture

A farm scene in New Ontario where large barns are needed to handle the crop.

which still exist in the vicinity of Port Arthur, Fort William, Rainy River, Dryden and all that western section. A great many enquiries have been received from the United States as well as from many sections of older Ontario. The experimental stage has been passed in many districts and the success of the pioneers demonstrates that north-western Ontario—which is in a lower latitude

than Winnipeg—has agricultural possibilities equal to any on the continent. The fertility of the soil has been demonstrated capable of growing to perfection nearly all kinds of grain, roots and vegetables, hay and clover. Then, too, the rapid development of big mining camps and the growth of big cities offers a ready market for all kinds of farm produce at high prices. Large areas of land in the older districts are still available and the completion of the T. & N. O. to Cochrane and the extension of the Grand Trunk Pacific have opened up still other splendid areas. An indication of the number of people going into this great country is seen in the fact that 2,599 settlers' railway certificates were issued by this Branch. These certificates call for a special rate of one and two-thirds cents per mile with a proportionate rate on effects. They are given only on assurance that the applicant desires to settle or look over land with a view thereto. The sale and location of Crown lands is under the control of the Department of Lands, Forests and Mines.

DEMONSTRATION FARM AT MONTEITH.

In 1907, the Department took over 800 acres of land in Northern Ontario to demonstrate the agricultural possibilities of that great country. The site selected embraced three quarter sections in the Township of Clergue, and two in the adjoining Township of Walker. It is located convenient to the townsite of Monteith on the Temiskaming and Northern Ontario Railway, 218 miles north of North Bay. The land was heavily timbered, and hence clearing was the first work undertaken, and there has as yet been little opportunity for growing crops. However, during the past year, in addition to clearing about 45 acres, some 20 acres were put under crop—chiefly wheat, oats and potatoes. The results abundantly attested the fertility of the soil in that district. An indication of the favourable climate is seen in the fact that fall wheat was sown on September 17th, 1909, and cut on August 12th, 1910, while spring wheat was sown on April 18th and cut at the end of September. Oats were sown on May 24th and cut about September 24th. Samples of the hay and grain and vegetables were shown at the Canadian National Exhibition and constituted a striking proof of the possibilities of Northern Ontario.

FACTORY INSPECTION.

Although not intimately related to agriculture, Factory Inspection and the Board of Stationary Engineers have been placed under this Department for purposes of administration.

Factory inspection was first undertaken in this Province in 1887, when two inspectors were appointed. It was not until some years later that a sub-department was organized on its present basis. The work has grown with the industrial growth of the Province, and at present, under a chief factory inspector, there are seven male and two female inspectors, each covering a separate section of the Province. The work is carried on to safeguard human life by inspecting the sanitary and mechanical arrangements in factories, bakeshops, etc. The inspectors also enforce the law with reference to child labor and assist in enforcing the Act respecting Stationary Engineers.

During the past year, 8,954 inspections were made in 452 cities, towns and villages. In these factories there were approximately 233,682 employees. In addition, 1,459 inspections were made in enforcing the Stationary Engineers' Act. The variety of the places inspected, together with the number of each, is shown by the following table:

Agricultural Implements	52	Packing Houses	28
Brick and Tile Works	137	Rubber and Gutta Percha	15
Cotton	36	Flax, Twine and Cordage	44
Clothing	1,622	Tobacco and Drugs	184
Chemicals	109	Wood	474
Conveyances and Accessories	83	Woollens	224
Food	610	Bakeshops	492
Glass	37	Confectionery	243
House Furnishings	66	Dry Goods Stores	369
Metals, Iron Founding, etc	243	Fancy Goods	91
Iron, Manufacturers of	317	Furniture Stores	7
Jewellery	20	General and Grocery Stores	216
Laundries	177	Hardware	39
Leather and Leather Goods	255	Harness	13
Locomotive and Car Shops	20	Jewellery Stores	25
Lumber	652	Music, Books and Stationery	75
Machinery	276	Millinery	188
Miscellaneous	748	Tailors	381
Paper and Paper Trades	386		

Many marked improvements were noted by the inspectors, especially in connection with canning and evaporating factories. Altogether there were 4,233 recommendations for improvements made by the inspectors, and the great bulk of these were acted upon. These recommendations dealt with the following subjects: Steam boilers, child labour, elevators, fire escapes, guards for machinery, hours of labor, ventilation, sanitation, seats (for females), mode of wearing the hair, cleanliness, miscellaneous.

STATIONARY ENGINEERS.

On the 20th day of April, 1907, an Act was passed for the purpose of compelling all engineers operating stationary steam plants of 50 horse power or more and carrying 20 pounds steam or more to hold a certificate of competency. To administer this Act, a Board of three was appointed, the Chairman being a permanent official and devoting his whole time to the work, and the two other members serving largely in a consultative capacity and being remunerated on a per diem basis. The expenses are provided out of the small fee charged for the annual certificate.

The object of this Act was to safeguard human life by requiring a reasonable standard of efficiency on the part of those handling engines. In order, however, that the Act should not work any unnecessary hardship, it was decided at first to grant certificates to all who could qualify under the following three heads:—

Form A. Anyone who, on the date of the passing of the Act, April 20th, 1907, had full charge and control of a stationary steam plant of 25 h.p. or over.

Form B. Anyone who, at the date of the passing of the Act, held a Marine, Locomotive, or British Board of Trade Certificate, or a Certificate from any duly qualified Board in the Province of Ontario.

Form C. Anyone who had two years' experience operating a stationary steam plant of 25 h.p. or over, in the Province of Ontario, previous to the date of the passing of the Act.

Certificates having been granted on these conditions for three years, it was felt in April last that the time had arrived when efficiency as attested by examination should be the only condition for the granting of certificates. Accordingly a regulation to this effect was adopted by the Board, dating from April 1st. For the purpose of giving engineers a convenient opportunity of trying the examination, the Chairman or other members of the Board visit the principal centres throughout the Province on dates properly announced. During the year, 483 wrote on the examination and of these sixteen per cent. failed. There were at the end of the year 6,267 certificates, the great percentage being renewals from the previous year.

At the last Session an amendment was passed giving the Board power to prosecute for the violation of the Act. It is the aim of the Department that the Act should be uniformly and fairly enforced, and with the aid of this legislation, I believe considerable progress has been made along these lines. The factory inspectors, as already noted, have also rendered valuable assistance in this connection.

PRESENT STATUS OF AGRICULTURE IN ONTARIO.

It seems opportune to add to this review of the history and work of my Department a few facts and figures in reference to the present status of agriculture in this Province. I desire to dispel the impression, if any such exists, that Ontario agriculture is decadent, and to establish clearly the fact that far from being a source of pessimism, there never was a time when agriculture was so prosperous or the outlook so bright.

First, let us look at the question of population. It has been frequently pointed out of late that there has been a considerable reduction in the population of the rural districts. Ever since 1886 there has been a downward tendency, the figures shown by the Bureau of Industries statistics being as follows:—

Rural population in 1886	1,148,946
" " " 1907	1,044,458
Rural decrease in 21 yrs.	104,488

It is my purpose to state facts rather than theorize as to causes. Hence, when we debit rural Ontario with the loss of a little less than ten per cent of its population, we should credit rural Ontario with several things. We should credit rural Ontario with the men who have in so large a measure enriched the cities with intellect, manhood and money; we should credit rural Ontario also with supplying the basis for the development of the splendid provinces of the West, for just as the United Empire Loyalists and other fine British stock fathered Ontario, so has Ontario fathered the West. As a part of Canada, Ontario, much less rural Ontario, cannot live unto itself alone, and it is unfair to note the trend of one section of the population without noting also the development of the Province and of the Dominion as a whole. Aside from direct migration, rural Ontario has contributed to the development of Ontario towns and cities by contributing to the development of the West, and hence we find by the Bureau of Industries statistics the following growth in the urban population of the Province:

Urban population in 1886	678,054
" " " 1907	1,155,905
Urban increase in 21 yrs.	477,851

All these facts may be frankly stated without in any sense minimizing the importance of restoring our own rural population to even more than it has ever been and developing the fertility of the soil to the greatest extent. It is, therefore, gratifying to be able to state that for the present at least the depopulation of rural Ontario has ceased, and there are signs that the trend is turning in the other direction. In 1908 the population of rural Ontario increased by 2,558 over 1907, while in 1909 there was an increase of 2,599 over 1908, the figures being again taken from the Bureau of Industries statistics. Thus in the two years there was a total gain of over 5,000, and every effort should be put forth to the end that these figures may be confirmed and increased in the years to come. The total population of the Province is given at 2,289,841 for 1909.

WEALTH OF FARMS INCREASES.

Looking on the other side of the picture, I would call attention to the fact that the agricultural wealth of the Province has increased rapidly, and both the

aggregate and the average prosperity are greater to-day than ever before. This may be proven in two ways—by the annual output and by the aggregate assets. It is necessary to go back no farther than six years, and the figures of the total field crops are given by the Bureau of Industries as follows:

1904	$ 134,304,690
1909	167,077,577
Increase in 6 years	$ 32,772,887

Shipping Fruit and Vegetables from Lambton County to the markets of the West.

These figures do not include orchards, small fruits, vineyards or garden truck, nor yet do they include the product of the live stock or the dairy, which constitute so important a part of the mixed farming as carried on in this Province. It is, therefore, well within the mark to say that the annual output of the farms of the Province is worth $250,000,000 and that there has been an increase in the past six years of $50,000,000. Thus, without any booming, and in spite of decreased production in some lines, there has been added to the yearly value of the output of the farms a sum equivalent to double the value of the fisheries of Canada and more than the total value of the mines of Ontario.

This increase in the value of the annual output has naturally been followed by an increase in the capital value of farm property. Live stock alone shows a decline in numbers in all branches and a decline in value in the last two or three years, but still shows a big increase in value over six years ago. The figures are as follows:

	Land	Buildings	Implements	Live Stock	Total
1904	$ 640,544,541	$ 257,995 484	$ 65,992,210	$ 163,383,103	$ 1,127,915,338
1909	680,789,629	297,690 826	77,790,754	184,747,900	1,241,019,109
Increase	$ 40,245,088	$ 39,695,342	$ 11,798,544	$ 21,364 797	$ 113,103,771

I submit these figures without comment, for the manner in which they illuminate the present agricultural status of Ontario calls for no comment.

BIG INCREASE IN YIELD PER ACRE.

Then it is sometimes thoughtlessly said that Ontario land is becoming decadent; that the soil is losing its fertility. On this point I beg to submit the yield per acre during the past year alongside of the average yield per acre for 29 years, showing that in practically every case there has been a material increase:

	1910 Yield	Average Yield
Fall Wheat	26.7	21.0
Spring Wheat	19.3	15.9
Barley	30.5	27.8
Oats	37.0	35.7
Rye	17.0	16.4
Buckwheat	24.1	20.3
Peas	14.9	19.3
Beans	17.9	17.2
Potatoes	130.	116.
Mangels	503.	459.
Carrots	296.	345.
Turnips	456.	430.
Mixed Grains	36.7	34.1
Corn for Husking	77.7	71.4
Corn for Silo	11.6	11.46
Hay and Clover	1.71	1.46

To show that the production of the past year over the average is not an isolated exception, it should be understood that there has also been a steady increase in the average. This is proof both of the fertility of Ontario soil and the improved methods of cultivation being adopted by Ontario farmers. It is, of course, always to be remembered that there are two great forces in crop production—the forces of nature and the forces of man—but it is to be noted that decreases are invariably attributed to the fault of human agencies.

ONTARIO LEADS ON CONTINENT.

It is of interest further to compare Ontario of the present not only with Ontario of the past, but also with other parts of the continent. Compared with the United States as a whole, we find that Ontario has a big lead in the production per acre. It is perhaps more fair to compare it with individual States. While a few States produce individual crops in greater yields per acre than Ontario, a study of the figures proves that there is, on the whole, no more fertile district on the continent than this Province. The following figures for 1909, taken from

official records, give comparison with six of the leading eastern agricultural States of the Union and typify the general situation, except that most of the other States do not compare so favorably:

——	Wheat	Barley	Oats	Potatoes	Hay
Ontario	24.1	27.0	33.5	145	1.20
Iowa	17.0	22.0	27.0	89	1.64
Ohio	15.9	25.9	32.5	93	1.43
Illinois	17.4	28.0	36.6	91	1.45
Kansas	14.4	18.0	28.2	78	1.45
Indiana	15.3	23.5	30.5	95	1.40
New York	21.0	24.8	28.2	120	1.05

The Ontario figures are below the average in barley, oats and hay.

STRAWBERRY SPECIAL—Train of Eleven Cars bringing Strawberries from fruit district to Toronto Market.

STILL ROOM FOR BIG ADVANCES.

These figures attest the progress of the Province and the progressiveness of Ontario farmers, but I do not desire to convey the impression that the end has been reached. On the contrary, there is still room for great increases in the returns which may be secured from the soil. For further stimulus we must look to the Old World, where agriculture has been practised for centuries and where the highest intelligence is brought to bear on cultivation. It is true that some of the old countries, such as France, Austria, Hungary and European Russia, show returns much less than Ontario. The following figures, however, show what Ontario may yet accomplish:

——	Wheat	Barley	Oats
England	33.61	36.78	42.45
Wales	28.09	31.88	35.37
Scotland	41.19	37.48	40.18
Germany	29.7	34.3	41.1
Belginm	34.0	46.5	64.7
Ontario	24.1	27.0	33.5

These three lines are typical of all branches of intensive agriculture as carried on in these countries. The results obtained should be an inspiration to Ontario, but of course it must be recognized that Old World countries possess advantages by way of length of seasons, evenness of climate and other conditions of a local nature.

PROGRESS AND OPPORTUNITY.

Equal emphasis, therefore, should be laid on the twin facts of progress and opportunity. These two words pointedly and concisely describe the present situation in the Province as far as agriculture is concerned. I have no desire to overlook the decreases which have taken place in many lines of production, especially in the live stock lines, but I do not think that these decreases, whether caused by the drouth or unsatisfactory market conditions of a few years ago or other economic reasons, should be allowed to befog the splendidly healthy condition of the agricultural industry as a whole at the present time. The manufacturer measures his prosperity, not by the number of articles he makes nor even by the number he sells, but by the balance at the end of the year's transactions; but if he finds he is making a reasonable profit on each article, and there is a demand for more of the same article, he naturally increases his output. And so it must be with the farmer. The fact that there is a demand in excess of the supply serves to emphasize strongly the opportunity that exists.

I have already outlined the various agencies through which this Department is endeavoring to assist the industry. The extent to which these are of value to the individual farmer is exactly the extent to which he avails himself of them. At the same time I am glad to say that the tendency of all this work is to get closer and closer to the individual. I am firmly convinced that the best results in the future can be obtained by more organization and co-operation. Organization is no new idea, but there are many important points to be learned from past experience. The day of the organization built on will-o'-the-wisp generalities, which have for their objective the millennium or the moon, is passing. It is being found that the organization which adds a few cents a dozen to the returns from eggs, or a dollar a barrel to the return from apples, or establishes the name of a particular district for a high quality of fruit or vegetables, is the organization which is really benefiting its members and building up the Province. There are many such organizations doing splendid work throughout Ontario at the present time, and I trust their number will rapidly increase. It is, I am persuaded, by localizing effort that the opportunities will be best developed and the progress of the past repeated and surpassed.

ELECTRICITY ON THE FARMS.

In considering future development in agriculture in this Province the prospect for the adoption of electricity for some of the work of the farm must be taken into account. For this credit is due the Hydro-Electric Power Commission which is now working out to success its plans for supplying power to towns and cities. I am glad to say that contracts have been let for the erection of a transformer station in connection with the Ontario Agricultural College at Guelph in order that this institution may have the benefit of Hydro-Electric power, which is expected to conduce both to efficiency and economy. But still more important are the plans which the Commission has on hand for placing cheap power at the disposal of the individual farmer in the electric zone.

The use of electricity on the farm is no new thing in the Old World. It has been adopted both for the encouragement of plant growth and as motive power in driving machinery of all sorts. The former is scarcely yet beyond the experimental stage, although experiments have been carried on for many years. In the Journal of the British Board of Agriculture for April last, J. H. Priestley, B.Sc., F.L.S., of the University of Bristol, relates the nature and results of experiments conducted on some twenty acres. It was carried on by means of overhead wires, and although the results are not yet regarded as conclusive, Mr. Priestley says: "The general assumption underlying the work is evidently that the passage of a small electric current through the plant is beneficial to it, and tends to increase the yield and often to lessen the time in which that yield is usually obtainable." He also quotes the yield in a number of crops in the years during which the experiments were carried on, and shows the following increases in the electrified crop over that which was not electrified: Canadian Red Fife Wheat increased 39 per cent.; English Red Queen, 29 per cent.; Barley, 5 per cent.; Mangolds, 18 per cent. In Germany and other European countries, mostly through municipal or communal plants, electricity is widely utilized in the villages and rural districts. The farm houses are wired for light and power, and thousands of small motors are employed in driving all kinds of machinery. Then, too, portable transformers with motors are taken out to the fields and hooked up to the nearest terminal posts, and power is thus made available for driving plows, threshing machines, etc. One portable transformer motor set may be used by the whole community.

I believe all these facts have an important interest to the farmers of Ontario at the present time. It is yet too soon to say how far electricity may be economically and successfully applied to the problems of the Ontario farm, but the extent to which invention has already revolutionized farm life gives basis for the most enthusiastic expectations. In the meantime I merely desire to add that this Department, in conjunction with the Hydro-Electric Commission, is anxious to render any assistance possible in placing the advantages of cheap electricity at the disposal of the farmers of the Province.

All of which is respectfully submitted.

JAMES S. DUFF,
Minister of Agriculture.

THIRTY-FIFTH ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1909

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

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To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present for the consideration of Your Honour, the Report of the Ontario Agricultural College and Experimental Farm for 1909.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

TORONTO, 1910.

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH

HON. JAMES S. DUFF, *Minister of Agriculture, Toronto.*

FACULTY OF INSTRUCTION, 1909-1910.

(All except the President arranged in order of Seniority.)

G. C. CREELMAN, B.S.A., M.S. ..... President.
H. H. DEAN, B.S.A. ..... Professor of Dairy Husbandry.
C. A. ZAVITZ, B.S.A. ..... Professor of Field Husbandry.
J. HUGO REED, V.S. ..... Professor of Veterinary Science.
H. L. HUTT, B.S.A. ..... Professor of Landscape Gardening.
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H. L. FULMER, B.S.A. ..... Demonstrator in Chemistry.
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Miss. E. C. DWIGHT, B.A. ..... Instructor in French and German and Acting Librarian.
Miss M. A. PURDY ..... Demonstrator in Chemistry.
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Miss JEAN RODDICK ..... Instructor in Domestic Science.
Mrs. F. DOUGHTY ..... Demonstrator in Domestic Art.
R. R. GRAHAM, B.A. ..... Demonstrator in Physics.
A. E. SLATER, B.S.A. ..... Demonstrator in Soil Chemistry.
Miss MARY MCLENNAN ..... Demonstrator in Domestic Science.
A. H. MCLENNAN, B.S.A. ..... Demonstrator in Poultry Husbandry.
ALEX. MCKAY ..... Demonstrator in Cheesemaking.
L. D. JACKSON, B.A. ..... Fellow in Chemistry.
Capt. WALTER CLARK ..... Drill Instructor.
(TO BE APPOINTED) ..... Instructor in Athletics.

COLLEGE OFFICERS.

S. SPRINGER ..... Bursar.
J. B. FAIRBAIRN ..... Secretary and Registrar.
W. O. STEWART, M.D. ..... Physician.
Mrs. K. FULLER ..... Superintendent Macdonald Hall.
Mrs. M. CUNNINGHAM ..... Matron Agricultural College.

ONTARIO AGRICULTURAL COLLEGE

AND EXPERIMENTAL FARM.

1909.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to submit herewith the thirty-fifth annual report of the Ontario Agricultural College and Experimental Farm, including the report of the Macdonald Institute, for the year 1909.

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Respectfully submitted,

G. C. CREELMAN,
President.

Ontario Agricultural College.

PART I.

THE PRESIDENT.

Last year in our Annual Report it was our privilege to record the largest attendance in the history of the College up to that time, viz., 1,225 students in all classes, including the longer and shorter courses in Agriculture and Home Economics. Again we have to report an increase over last year and record 1,296 students in attendance at all classes. This means that the professors, lecturers and demonstrators have all had increased work, and that the class-rooms and laboratories have been overcrowded to a greater extent than ever before. We are pleased to note the continued appreciation of our work by the farmers of the Province, and we are further pleased to think that the other Provinces, as well as other countries of the world, still continue to send us students from year to year.

Changes in Staff.

It is remarkable that with so many tempting offers to go to other institutions, our staff as a whole remains loyal to this College. Each year we are asked to recommend a number of our graduates for positions of trust in this and other countries, at salaries greater than those paid to our senior professors, and we have young graduates now in agricultural college and experiment station work, to the number of at least a dozen in the United States, receiving from twenty to fifty per cent. higher salaries than those paid to our senior professors.

In the Physical department, Mr. C. C. Thom, B.S.A., resigned the position of Demonstrator in the spring, and Mr. R. R. Graham, B.A., was appointed in his place. Mr. A. H. MacLennan, B.S.A., has been appointed Demonstrator in Poultry Husbandry, his duties to commence the 1st of January, 1910. Mr. M. F. Coglon, B.S.A., resigned his position as Fellow in Chemistry to accept a position as chemist at the Agricultural College in Mississippi, U.S.A. His place was filled by the appointment of Mr. L. D. Jackson, B.A., graduate of McMaster University, Toronto. Mr. A. E. Slater during the year was also appointed to the Chemical department as Demonstrator. The Resident Master, Mr. G. M. Frier, B.S.A., resigned in June to take a position in the department of Agronomy in connection with the Agricultural department of Purdue University, Lafayette, Indiana. Mr. G. H. Unwin, B.S.A., was appointed as Dean of Residence, and he has been unusually successful in his management of the students in the College dormitory. Miss Hardy, College Matron, also resigned in February, and her place was filled by the appointment of Mrs. Margaret Cunningham.

At Macdonald Institute Miss Fonda, Assistant Instructor in Domestic Art, resigned at Easter, and her position was filled by the appointment of Mrs. F. Doughty. At the same time Miss Givin, who has been with Macdonald Institute

since its beginning, and whose efficient services have added so much to the success of the institution, on account of ill health was obliged to resign her position as Instructor in Domestic Science. Miss Jean Roddick, of Toronto, was appointed in her place. Miss Edna Ferguson resigns now and leaves on the 1st of January to become Domestic Science teacher in the Collegiate Institute at Berlin. Miss Mary McLennan, a graduate of Macdonald Institute, has been appointed as Instructor in Domestic Science in the place of Miss Ferguson. Miss N. Macmillan, who has been Supervisor of House Practice for the past two years, leaves also on the 1st January to accept a position in Quebec, and Miss E. Maddock, of last year's graduating class, will succeed to the duties of Miss Macmillan on January 1st.

The Minister of Agriculture has seen fit during the year to establish a new department at the College—a department of Apiculture, with Mr. Morley Pettit. of Aylmer, in charge. Arrangements are being made to erect a suitable building for the care and management of bees, and the greater part of the apiary started last year at the Horticultural Experiment Station at Jordan will be moved to the College grounds early next spring. Mr. Pettit has gone about his work in a systematic, business-like way. The lecture periods have been extended from six weeks to three months, and a number of the students are already showing special interest in this work.

Home Economics.

While Macdonald Institute is a comparatively new addition to the College, it has almost from the beginning had sufficient students in attendance to tax the capacity of our class-rooms and to over-tax the teaching staff. Every room in Macdonald Hall has been taken during the last two years, and more than fifty applications had to be refused or held over at the opening in September last. Again we have a waiting list over and above those necessary to fill all the vacancies at the begining of the year, and we must soon decide upon a new policy for regulating the attendance in our Home Economics Classes. We shall either have to increase the capacity of Macdonald Hall and add to the teaching force, or we shall have to restrict the attendance, by refusing applications from young ladies from the cities and accepting only those who come from farm homes. Already we are prepared to discriminate in favor of farmers' daughters, but the difficulty so far has been that while we have had a fair attendance of girls from the farms, they have made application so late that in order to be sure of a full attendance, we have thought it best to accept the applications in the order in which they have been received, and then giving the farmers' daughters applying late a first chance where vacancies occur through the dropping out of early applicants.

College Work and Progress.

The crowding is still more apparent in connection with the men's departments. Every bed has been occupied in the College Residence, and yet nearly a hundred have been obliged to board out. This is to be regretted, as much better work can be done and a much better influence can be exercised over students where they are under the restriction of Residence rules all the time. We are asking this year for a new dining-hall, with servants' quarters on the second floor, and if this can be secured, the present dining-room, store-room, serving-rooms, servants' quarters, and so forth may be converted into additional rooms for Col-

lege students and so relieve the pressure which is now being brought to bear upon us by students who are obliged to live outside.

The bulletins prepared during the year by members of the College Staff and published by the Department of Agriculture, are as follows:

169. "Legume Bacteria: Further Studies of Nitrogen Accumulation in the Leguminosae," by S. F. Edwards and B. Barlow.
171. "Insects Affecting Vegetables; Fungus Diseases Affecting Vegetables," by J. W. Eastham and J. E. Howitt.
172. "Dairy School Bulletin," by the Staff of the Dairy School, Guelph.
174. "Farm Underdrainage; Does it Pay?" by W. H. Day.
175. "Farm Drainage Operations," by W. H. Day.
176. "Bacterial Blight of Apple, Pear and Quince Trees," by D. H. Jones.
177. "Lime Sulphur Wash," by H. L. Fuller and Lawson Caesar.
178. "Character and Treatment of Swamp or Muck Soils," by W. P. Gamble and A. E. Slater.

Short Courses.

These courses continue very popular and are accomplishing more than was at first anticipated. We find a number of young men who take these short courses of a few weeks in the winter time returning for longer courses during the next or subsequent sessions of the College. We also find many men returning year after year for these short courses, some taking more than one course and some remaining for special work in the different College departments at the close of the special course which they came to attend. The attendance in these courses in 1909 was as follows: Dairy Courses, 36; Teachers' Course (Agricultural, Horticulture and Industrial Arts), 134; Short Course in Stock and Seed Judging, 207; Short Course in Poultry Raising, 15; Short Course in Horticulture, 54; One-Month Course in Domestic Science, 11; One-Month Course in Elementary Agriculture and Nature Study, 58; One-Month Course in Manual Training, 26.

STUDENTS OF THE YEAR.

Attendance.

General Course	439
Specialists in General Course Work	11
Manual Training (One Year Normal Course)	4
Dairy Courses	36
Teachers' Course (Agriculture, Horticulture and Industrial Arts)	134
Short Courses in Stock and Seed Judging	207
Short Course in Poultry Raising	15
Short Course in Horticulture	54
	900

At Macdonald Institute.

Domestic Science	314
Nature Study and Elementary Agriculture (58); Industrial Arts (26)	84
	398
Total	1,298

There were also 131 children from the Guelph Public Schools who received instruction in Domestic Science at Macdonald Institute.

Analysis of College Roll, (General Course) 1909.

From Ontario.

Algoma	1	Kent	6	Peterboro	2
Brant	9	Lambton	7	Prescott	1
Bruce	7	Lanark	2	Prince Edward	1
Carleton	8	Leeds	2	Rainy River	2
Dufferin	2	Lennox and Addington	3	Russell	4
Dundas	4	Lincoln	9	Simcoe	9
Elgin	6	Middlesex	11	Stormont	1
Essex	1	Muskoka	3	Victoria	4
Frontenac	2	Nipissing	1	Waterloo	12
Glengarry	1	Norfolk	4	Welland	9
Grenville	3	Northumberland	4	Wellington	25
Grey	7	Ontario	14	Wentworth	17
Haldimand	5	Oxford	17	York	34
Halton	9	Parry Sound	2		
Hastings	8	Peel	6	Total for Ontario...	295
Huron	5	Perth	5		

From Other Provinces of the Dominion.

Alberta	9	Nova Scotia	9	Saskatchewan	11
British Columbia	24	P. E. Island	1		
Manitoba	2	Quebec	1	Total for other Provinces	58
New Brunswick	1				

From Other Countries.

Argentine Republic...	1	Ireland	3	Spain	4
Belgium	1	India	2	U. S. A.	19
East Indies	1	Japan	2	Wales	2
England	22	Jamaica	5		
France	1	New Zealand	2	Total for other Countries	86
Germany	1	Scotland	9		
Holland	1	South Africa	10		

Ages and Religious Denominations.

The limits of age of students in the General Course, 1909, ranged from 16 to 40 years. The average age was 20.

Baptist	27	Evang. Assoc.	1	No Religion	4
Christadelphian	4	Friends	3	Presbyterian	126
Congregational	7	Hinduism	1	Quaker	1
Disciple	3	Lutheran	1	Roman Catholic	18
Dutch Reform	3	Mennonite	2	Unitarian	2
Episcopalian	110	Methodist	121	United Brethren	5

Bachelors of the Science of Agriculture, 1909.

Allan, R. J., Guelph, Ont.
Angle, P. E., Forks Road, Ont.
Bailey, C. F., Kentville, N.S.
Campbell, A. D., Strathroy, Ont.
Coke, E. F., Lynhurst, Mile Gulley, Jamaica.
Cutler, G. A., Roleau, Sask.
Diaz, G., Ferrol, Spain.
Duff, H. C., Dobbington, Ont.
Eastham, A., Guelph, Ont.
Foster, N., Toronto, Ont.
Irvine, W. H., Habermehl, Ont.
Jackson, W. D., Fulton, Ont.
Jones, J. W., Pownal, P. E. I.
Joubert, M. J., O. R. C., South Africa.
Knight, A. A., Brackenrig, Ont.
Lawrence, C. A., Stratford, Ont.
Logsdail, A. J., London, England.
McIntosh, A. D., Guelph, Ont.
McKenzie, N. D., Galt, Ont.
McLaren, A., Edinburgh, Scotland.
Monroe, J. F., St. Anne de Bellevue, Que.
Sirett, H., Rosseau, Ont.
Stafford, E. W., Toronto, Ont.
Thompson, W. R., London. Ont.
Treherne, R. C., Guelph, Ont.
Turney, A. G., Saventhen, Belgium.
Unwin, G. H., Truro, N. S.
Waddell, W. M., Kerwood, Ont.

RECIPIENTS OF ASSOCIATE DIPLOMA, 1909.

Andrew, D. A., Lucknow, Ont.
Austin, R. G., Tottenham, Ont.
Baker, A. C., Harding Hall, London, Ont.
Baker, A. W., Harding Hall, London, Ont.
Baldwin, M. M., Colchester, Ont.
Bradt, E., York, Ont.
Buchanan, C. W., Florence, Ont.
Callister, G., Reading, England.
Clark, T. O., Box 1906, Calgary, Alta.
Clement, F. M., Virgil, Ont.
Coglon, R. B., Coutts, Alta.
Cohoe, D. P., New Durham, Ont.
Culp, A., Vineland, Ont.
Culp, S. H., Vineland, Ont.
Cowle, A. J., Caledonia, Ont.
Dempsey, P. C., Trenton, Ont.
Edgar, F. G., Toronto, Ont.
Emerson, W. W., Foxboro, Ont.
Ewing, A. A., Englehart, Ont.
Filson, H. S., Stella, Ont.
Fisher, P. A., Burlington, Ont.
Forsyth, F., Glasgow, Ont.
Freek, F. M., Barrie, Ont.
Galbraith, C. A., Hornby, Ont.
Gandier, S. H., Lion's Head, Ont.
Henderson, I. B., Hampden, Ont.
Herner, M. C., Mannheim, Ont.
Heurtley, E. W., Ashington, Sussex, England.
Hopkins, E. S., Lindsay, Ont.
Howard, C. F., Hagersville, Ont.
Howell, J. S., Jerseyville, Ont.
Hutchinson, A., Mount Forest, Ont.
Innes, R., Halifax, N. S.
Jones, J. W., Pownal, P. E. Island.
Keegan, H. L., Monkstown, Dublin, Ireland.
King, V., Gravesend, Kent, England.
Lawson, J. D., Brockville, Newport, Scotland.
Light, P., Hensall, Ont.
McAleer, H. A., Chestnut Hill, Philadelphia, U. S. A.
McArthur, Max., Gobles, Ont.
McFayden, C., Caledon, Ont.
McIntosh, A. D., Guelph, Ont.
McKillican, C. G., Vankleek Hill, Ont.
Main, C., Sheffield, Ont.
Marcellus, F. N., North Winchester, Ont.
Marryat, U. G., Alix, Alta.
Martin, L. R., Jordan Harbour, Ont.
Monk, B. F., Springford, Ont.
Orser, O. R., Kepler, Ont.
Orvis, W. G., Dryden, Ont.
Palmer, F., Victoria, B. C.
Peart, G. S., Freeman, Ont.
Presant, J. E., Guelph, Ont.
Ross, W. A., Edinburgh, Scotland.
Schuyler, R., Jarvis, Ont.
Scott, W. R. M., Toronto, Ont.
Shortill, R. J. R., Ballinafad, Ont.
Stafford, E. W., Toronto, Ont.
Strong, W. J., Lanes Farm, Hatfield, Peveral, Essex, England.
Thomson, R. G., Boharm, Sask.
Toole, A. A., Mount Albert, Ont.
Toole, W., Whitevale, Ont.
Whale, I. B., Goldstone, Ont.

FIRST CLASS MEN.

The work of the College is divided into departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department, are ranked as first class men in that department. The following list contains the names of those who gained a first class rank in the different departments, at the examinations held in April, 1909, arranged alphabetically.

FIRST YEAR.

Beckett, R., in one department, English and Mathematics.
Bosman, A. M., in one department, Physics.
Kelly, W. A., in two departments, Biology; Physics.
Knapp, J. S., in two departments, Agriculture; Physics.
McIlquham, J. M., in three departments, English and Mathematics; Biology and Physics.
McTaggart, A., in one department, Physics.
Palmer, E. B., in two departments, Physics; Biology.
Rebsch, C. C., in two departments, Physics; Biology.
Reeves, F. S., in two departments, Physics; Biology.
VanSickle, P. O., in four departments, English and Mathematics; Physics; Biology and Agriculture.
Weir, E. A., in three departments, English and Mathematics; Chemistry and Physiology; Biology.

SECOND YEAR.

Baker, A. C., in one department, Biology.
Dorrance, H. A., in one department, English.
Emerson, W. W., in one department, English.
Palmer, F., in one department, Biology.
Strong, W. J., in two departments, English and Biology.
Toole, W., in three departments, English; Biology and Agriculture.

Scholarships.

Scholarships of $20 each in money were awarded for groups of subjects in first year work as follows: Highest standing with a minimum of forty per cent. of the marks for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group:

English and Mathematics, E. A. Weir, Randwick, Ont.
Agriculture, P. O. VanSickle, Trinity, Ont.
Biological Science, F. S. Reeves, Ash Church, Tewkesbury, Gloucestershire, England
Physical Science, J. M. McIlquham, Lanark, Ont.

The George Chapman Scholarship.

A prize of $20 in books awarded on the work in English of the first two years. The three divisions of the work under the English Department are taken into consideration in awarding the prize, namely, English Literature, English Composition and Public Speaking. Winner in 1909: H. A. Dorrance, Seaforth, Ont.

Prizes.

Three prizes of the value of $10 each in books, were awarded as follows:

One to the second year student who composed and read before a committee the best essay on the subject assigned for the year, viz., "The Farmer in Politics." Winner: W. W. Emerson, Foxboro, Ont.

One to the student who stoood first in general proficiency on first and second year work—Theory and Practice—Wade Toole, Whitevale, Ont.

One to the student who ranked highest in general proficiency and obtained first-class honours in his major subjects in the fourth year. Winner: W. R. Thompson, London, Ont.

Medals.

Governor-General's Silver Medal: First in General Proficiency, First and Second Year work, 1908-1909. Winner: Wade Toole, Whitevale, Ont.

Barton-Hamer Gold Medal: Awarded to that member of the O. A. C. International Live Stock Judging Team, securing the highest number of marks in the Student's Judging Contest, held annually at Chicago. Winner: N. D. McKenzie, Galt, Ont.

Cash Prizes Won at Guelph Winter Fair.

On Friday, December 10th, at the Guelph Winter Fair, a judging competition in Live Stock was held for young men twenty-five years of age and under. The competitions were in charge of Prof. G. E. Day, R. S. Stevenson, J. E. Brethour, and J. Jackson. Sixty per cent. of the points was given for placing, forty per cent. for reasons. The O. A. C. students who won in the various classes are as follows:

Beef Cattle: First, W. A. Kelly; second, D. S. Macdonald; third, T. S. D. Harding; fourth, W. N. Campbell; fifth, W. J. Fraser; sixth, C. J. Ackers; seventh, A. McTaggart; eighth, W. V. Longley; ninth, J. C. Yule; tenth, W. B. Milner.

Dairy Cattle: First, G. S. Dunkin; second, J. N. Sorley; third, J. M. McIlquham; fourth, H. King; fifth, Outsider; sixth, G. Wilson; seventh, A. A. Whaley; eighth, W. H. Moore; ninth, H. H. Lindesay; tenth, J. A. Carroll.

Horses: First, M. C. Herner; second, A. A. Toole; third, J. C. Steckley; fourth, R. L. Rutherford; fifth, I. B. Whale; sixth, E. W. Heurtley; seventh, J. E. Smith.

Sheep: First, J. Laughland; second, J. C. Yule; third, Outsider; fourth, A. McTaggart; fifth, S. A. Bergy; sixth, J. E. Rettie; seventh, C. M. Learmonth; eighth, A. M. Bosman; ninth, J. M. Falconer; tenth, J. B. Grange.

Swine: First, E. B. Palmer; second, F. W. Renwick; third, P. Stewart; fourth, W. A. Kelly; fifth, S. H. Clark; sixth, Outsider; seventh, C. A. Barnett; eighth, A. W. Pate; ninth, G. C. Miller; tenth, F. A. Bennett.

Professional Dairy School Certificates Issued During 1909.

Freeman, Wm. A., Condersport, Pa., U. S. A. ..... Cheesemaking
Miller, A. Alex., Jarvis, Ont. ..... Buttermaking
Yone Yama, Y., Yamura, Machi, Yamanashi, Ken, Japan ..... Buttermaking

Recipients of Teachers' Certificate in Domestic Science.

A.—*Graduates of Two-year Normal Class:*

Miss Miriam A. Ames, Toronto, Ont.
" Gladys M. Black, Acton, Ont.
" Edna E. Hartley, Brantford,
" Anita E. Hill, Guelph, Ont.
" Katherine James, Charlottetown, P. E. I.
Miss Mary Longstreet, Brantford.
" Annie MacDonald, Lanark.
" Bessie H. Peebles, Hamilton.
" Beatrice L. Williams, Pewamo, Mich., U. S. A.

B. *Graduates of One-year Normal Class:*

Miss Emily Blenner-Hassett, Mount Forest, Ont.
" Ethel E. Gromitt, Toronto, Ont.
Miss Netta M. Nixon, St. George,
" Ellen E. Pearson, Stratford,
" Susan L. Tyson, Wiarton, Ont.

Recipients of Housekeeper Certificate.

Miss Jessie Blyth, Marden, Ont.
" Mary B. Daniel, Pugwash, Nova Scotia.
" Maud Davison, Cannington,
" Eliza Maddock, Guelph, Ont.
Miss Marion K. Rutherford, Owen Sound, Ont.
" Charlotte Scott, Perth, Ont.
" Nealina Macmillan, Guelph,

Recipients of Professional Housekeeper Certificates.

Miss Jean G. Allan, graduated, 1905.
" Ethel Tennant, graduated 1905.
" Erie Shand, graduated 1906.
" Jennie McKenkie, graduated 1906.
Miss Sarah Bray, graduated, 1907.
" Robena Murdoch, graduated 1907.
" Mabel Mortimer, graduated 1907.

Recipients of Homemaker Diploma.

Miss Helen Bankier, Hamilton, Ont.
" Grace Bray, Nashville, Ont.
" Jeanie Bray, Nashville, Ont.
" Helen G. Cassels, Toronto, Ont.
" Winifred Cooper, Montreal, Que.
" Gladys Forster, St. Andrews, N.B.
" Helen Fowler, Winnipeg, Man.
" Eleanor Greig, Almonte, Ont.
" Fanny Harris, London, Ont.
" Louise Julyan, Leith, Ont.
" Ilda Madden, Orillia, Ont.
" Eva McCall, Vittoria, Ont.
" Frances MacKeen, Glace Bay, N.S.
" Annie Palmer, Norwich, Ont.
" Margaret Peart, Freeman, Ont.
" Annie Pettingell, Quispamsis, N.B.
" Hilda Rochester, Westboro, Ont.
" Annie Thompson, Moose Jaw, Sask.
" May Walker, Floradale, Ont.
" Marjorie Wallace, Toronto, Ont.
" Eveline Whitney, Hamilton, Ont.
" Frances R. Young, Kentville, N.S.
" Eva Tweddle, Fruitland, Ont.

SUMMARY OF ATTENDANCE—MACDONALD INSTITUTE.

A.—January to June, completing the College year of 1908-1909.

Normal Students:	35
(*a*) Seniors—Two year, 10; (*b*) Seniors—One year, 5; (*c*) Juniors, 20.	
Housekeepers:	14
(*a*) Seniors, 7; (*b*) Juniors, 7.	
Homemakers:	34
(*a*) One year, 31; (*b*) Two years, 3.	
Short Course in Domestic Science:	88
(*a*) Winter term, 48; (*b*) Spring term, 40.	
Short Course in Sewing (Spring term only):	8
Optional:	10
Student-workers:	6
Public and High School Students:	76

B.—Summer Course in Domestic Science 11

C.—September to December, opening the College year of 1909-1910.

Normal Students:	41
(*a*) Seniors—Two year, 21; (*b*) Seniors—One year, 4; (*c*) Juniors, 16.	
Housekeepers:	17
(*a*) Seniors, 6; (*b*) Juniors, 11.	
Homemakers:	31
(a) One year, 30; (b) Two year, 1.	
Short Course in Domestic Science:	30
Short Course in Sewing:	11
Optional:	3
Student-workers:	4
Public and High School Students:	55
Total	474

D.—Students counted in both lists:

In two year courses	25
In Public and High School Classes	4
Total	29

E.—Total number of students in 1909 445

F.—Total number of students in 1908 414

STOCK JUDGING.

Again we sent a team of Fourth Year students to the International Live Stock Exposition held in the city of Chicago in the early days of December. The team was composed of the following men: W. E. J. Edwards, Balsam, Ont.; R. L. Moorehouse, Cairo, Ont.; W. R. Reek, Romney, Ont.; A. M. Shaw, Niagara Falls, Ont., and O. C. White, Ashburn, Ont. While not successful in securing the first prize this year, they made a remarkably good showing, standing second in general proficiency for horses, cattle, sheep, and swine. Mr. O. C. White stood second in the entire list of competitors, and Mr. Reek stood 9th. The standard has evidently been raised in this competition from year to year. When our Mr. Hamer in 1907 stood first in general proficiency over all competitiors, he had but nine marks in the aggregate higher than our Mr. Reek of this year's class, who stood but 9th.

When we take into consideration that many of the classes of live stock, particularly in horses and swine, are entirely different in conformation and type from

the breeds commonly bred and exhibited in Canada, we will realize that our students are very badly handicapped, in comparison with the students from American colleges, who have the privilege of practising on all the classes of stock that are brought before them at the time of the international competition.

The men on our staff who prepare a new class for Chicago each year, and also prepare scores of young men who annually take part in the judging competitions at our own Provincial Winter Fair, deserve great credit for the standard and proficiency to which these young men attain.

Excursions.

The month of June was again devoted to Farmers' Institute excursions, and again from all parts of the Province came farmers in large numbers each day, to look over the College and the College Farm. It is remarkable that these men come back to the College year after year, and each time seem to take a greater interest in the work than ever before. The questions asked are more pertinent, the numbers who tramp all over the farm grow larger; and those who come for mere enjoyment or a day's outing seem to be fewer in number each year. It is gratifying to see the continued interest the farmers are taking in the work we are doing.

The College also entertained the members of many organizations directly or indirectly interested in our work, and during the year the following associations visited us:

June 3 and 4, East and West Lambton Teachers' Association;
June 10 and 11, East and West Kent Teachers' Association;
June 19, Toronto Canadian Club;
June 26, International Congress of Women;
Nov. 4 and 5, Canadian Entomological Society.

Women's Institutes.

This organization has become a powerful factor in our rural economy. Thousands of women, in the aggregate, meeting in small numbers all over the Province, are already showing their influence on the farming community. The life in the farm home is not so monotonous; more and better reading matter is being introduced, and the farmer's wife and daughter, through the Women's Institute, has an avenue for the exchange of ideas and for the exercise of their social natures, such as they have never had before. At the Annual Convention at the College in December, Massey Hall was again crowded to its utmost capacity by the delegates from the different Institutes. The papers and discussions, which I trust will all be published in the Report of the Women's Institute Work, should make very interesting reading, indeed, for those who live in farm homes.

Experimental Union.

As usual, the first day of the Union was not well attended. As it was, the President and those who arrived at the College in time for the opening exercises were obliged to leave home on the previous Saturday. Acting, then, upon our suggestion in last year's report, the executive committee were instructed to carefullly consider the advisability of changing the date of the Experimental Union to some time in January, during one of the Short Courses. This will insure a larger attendance of farmers, and it will give our students, who have not examinations im-

mediately ahead of them, an opportunity to attend all of the meetings. It will give the members better hotel accommodation in Guelph than if held, as usual, at the time of the Winter Fair, and it will give those who are conducting work for the Experimental Union a little more time in which to prepare their reports for the meeting. Further than that, it will give the officers of the Union an opportunity to spread their work out a little more. As it is now, having only three sessions, the work has to be condensed too much, and it is not at all satisfactory. Again, those members of our staff and of the student body who assist at the Winter Fair, who have not now an opportunity of attending the sessions of the Experimental Union, will all be able to attend all of the meetings, if the change of date be made, as suggested.

Outside Lecturers.

A number of excellent lectures were delivered before the members of our student body in Massey Hall at regular intervals during the year. These lectures proved very interesting and instructive, and we are obliged to the following persons for the assistance which they have rendered to us:

Prof. W. J. Alexander, University of Toronto, Toronto.—"Shakespeare."
Dr. J. W. Robertson, Macdonald College, Que.—"The New Education."
Rev. John Anthony, Agincourt.—"Birds."
Miss Field, Toronto.—"English Literature."
Prof. H. T. J. Coleman, University of Toronto, Toronto.—"Geology."
Mr. E. S. Williamson, Toronto.—"Dickens."
Mr. E. S. Williamson, Toronto.—"Dickens."

Agricultural Specialists in County Towns.

Three more agricultural specialists were added to the list in June last, making eleven graduates now engaged in this work. The new men were: H. C. Duff, for Peterborough County, located at Norwood; H. Sirett, for Carleton County, located at Carp, and P. E. Angle, for Norfolk County, located at Simcoe. These eleven men are all enthusiastic in their work and seem to be highly successful in it. They are forming farmers' clubs, holding short courses in stock and seed judging and in fruit growing, growing experimental plots, experimenting with fertilizers, establishing school gardens, holding agricultural exhibitions for school children, giving farmers plans of their farms for tile drainage, conducting spraying demonstrations in orchards, preparing education exhibits and giving instruction at fall fairs, encouraging co-operative societies among farmers, and teaching pupils in the local high schools. These are some of the things in which these young men have interested themselves, and we trust that some day the money may be found to place one or more of these men in every county of the Province.

Financial Statement.

I append the Financial Statement prepared by Mr. S. Springer, Bursar. It for the ten months, January to October inclusive, to correspond with the change in the fiscal year of the Provincial Legislature.

I have the honour to be,

Your obedient servant,

Guelph, December 20, 1909. G. C. CREELMAN.

FINANCIAL STATEMENT.

(10 months, Jan. 1st to Oct. 31st, 1909.)

COLLEGE DEPARTMENT.

Expenditure.

Salaries and wages	$51,048 68
Servants' paylist (including laundryman)	2,955 00
Meat, bread, groceries, laundry, engine room supplies and fuel	30,327 51
Advertising, printing, postage and stationery	3,373 87
Maintenance, 5 laboratories and gymnasium	3,983 91
Expenses, short courses	1,194 79
Temporary assistance	1,050 92
Student labor	3,257 68
Travelling expenses and extra lectures	1,489 20
Library	1,677 09
Scholarships	80 00
Telephone service, rent, etc.	395 50
Furnishings and repairs	3,987 87
Sewage	406 10
Contingencies	850 50
Total Expenditure	$106,078 62
Less Revenue	30,007 31
Net Expenditure	$76,071 31

Revenue.

Board	$18,140 25
Tuition and laboratory fees	10,807 50
Supplemental examinations	101 00
Chemical analyses	162 50
Rent of cottages	182 50
Rent of rooms	121 50
Rent of Post Office boxes	39 50
Fines and breakages	447 16
Sundries	5 40
Total Revenue	$30,007 31

Student Labor.

Total per Month.

January	$604 21
February	506 08
March	471 91
April	214 46
May	318 68
June	195 19
July	175 84
August	223 14
Sept. and October	548 17
	$3,257 68

To Different Departments.

College Department	$205 82
Macdonald Institute	51 45
Chemical Laboratory	125 35
Bacteriological	14 24
Entomological	88 68
Physical	86 67
Botanical	20 90
Library	83 53
Farm Department	638 20
Experimental	1,045 13
Poultry	260 21
Horticultural	286 52
Dairy Department	34 20
Mechanical	316 78
	$3,257 68

MACDONALD INSTITUTE AND HALL.

Expenditure.

Salaries and wages	$13,319 50
Servants' pay list	1,523 00
Bread, meat, groceries, furnishings, repairs, engine room supplies and fuel, and labor on grounds	10,494 73
Maintenance of laboratories in Institute	2,398 61
Library and stationery	468 29
Total Expenditure	$28,204 13
Less Revenue	19,074 36
Net Expenditure	$9,129 77

Revenue.

Board	$12,409 60
Tuition and laboratory fees	6,396 60
Supplemental examinations	4 00
Fines, breakages and food purchases by students	152 46
Sale of supplies to Manual Training students	111 70
Total Revenue	$19,074 36

FARM DEPARTMENT.

Expenditure.

Permanent improvements	$419 96
Wages of men, foreman and stenographer	5,569 71
Purchase of live stock	3,276 53
Maintenance of stock	2,646 09
Farm maintenance (including repairs, blacksmithing, binder twine, seed, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.	1,941 69
Contingencies	232 03
Total Expenditure	$14,086 01
Less Revenue	7,048 07
Net Expenditure	$7,037 94

N.B.—Nothing allowed the Farm Department for the feed, etc., of the department horses, and supplies for the College and Macdonald Hall, including milk.

Revenue.

Sale of cattle:—		
27 steers, 34,880 lbs., at from 5 to 7 cts.	$1,964 50	
1 bull for	80 00	
1 cow, 1,590 lbs., at 6 cts.	95 40	
5 cows at from $35 to $60	230 00	
1 heifer for	50 00	
8 calves for	390 00	
		$2,809 90
Sale of pigs:—		
156 hogs, 32,250 lbs., at from 5½ to 8.1 cents	$2,333 64	
12 hogs at from $2.50 to $10.00	76 00	
3 sows, 1,015 lbs., at from 4 to 6½ cents	47 22	
1 sow for	30 00	
		2,486 86
Sale of sheep:—		
16 lambs at from $4.00 to $10.00	$107 00	
2 sheep at $6.00	12 00	
1 sheep, 210 lbs., at 4½ cents	9 45	
		128 45

Sale of horses, 2 for		625 00
Service of animals		93 00
Sale of wool, 442 lbs. at 12½ cts.		55 25
" 1 horsehide		2 50
" 2 sheepskins at $1		2 00
" 6 bags small potatoes at 25 cts.		1 50
" 11 bags at 25 cts.		2 75
" grain,, 39 bus. wheat at from $1.25 to $1.50		56 25
Sale of Milk:—		
9,675 qts. at 4 cts.	$387 00	
1429.47 lbs. fat at from 24 to 34 cts.	390 18	
3713 lbs. skim-milk at 20 cts.	7 43	
		784 61
Total Revenue		$7,048 07

EXPERIMENTAL DEPARTMENT.

Expenditure.

Permanent improvements	$599 98
Assistant, specialist in plant breeding, stenographer, foreman, teamsters and laborers	7,794 88
Seeds, manure and special fertilizers	546 64
Furnishings, implements, repairs, blacksmithing, etc.	580 00
Printing, postage, stationery, contingencies, etc.	279 85
Purchase of horse	225 00
Total Expenditure	$10,026 35
Less Revenue (Sale of 1 horse)	120 00
Net Expenditure	$9,906 35

DAIRY DEPARTMENT.

Expenditure.

Permanent improvements	$396 25
Wages, including foreman, cheesemaker, buttermaker, engineer, stenographer and bookkeeper, assistant and official tester of dairy cattle	2,542 00
Purchasing, hauling and manufacturing milk into butter and cheese	3,345 20
Furniture, furnishings, repairs, etc., laboratory expenses, gas, chemicals, etc., and contingencies	798 97
Fuel and light	235 31
Total Expenditure	$7,317 73
Less Revenue	5,122 23
Net expenditure	2,195 50

Revenue.

Sale of butter, 111 lbs. at from 15 to 26 cts.		$20 50
" cheese, 14,180 lbs. at from 6 to 13 cts.		1,653 99
" cream, 570 qts. at 20 cts.		114 00
" fat, 590.68 lbs. at from 25.5 to 33 cts.		163 06
" skim-milk, 48,030 lbs. at from 10 to 20 cts.		67 38
" buttermilk, 106,170 lbs. at from 10 to 40 cts.		121 78
Milk tests		107 30
Rent of house		90 00
Manufacturing butter:—		
14,025.66 lbs. at 3 cts.	$420 77	
59,085.94 lbs. at 4 cts.	2,363 45	
		2,784 22
Total Revenue		$5,122 23

DAIRY SCHOOL.

EXPENDITURE.

Permanent improvements, cement floors, walks, etc.,	$99 90
Wages of instructors, engineer, janitor, stenographer and book-keeper	2,515 00
Cleaning, painting, repairs and contingencies	282 08
Dairy appliances, separators, vats, expenses, cheese and butter judges, inspecting factories, etc.	447 29
Advertising, printing, stationery, postage, books, papers, etc.	111 82
Fuel and light	594 34
Purchase of milk for cheese-making, and cost of hauling milk and cream	2,377 91
Total Expenditure	$6,428 34
Less Revenue	1,832 91
Net expenditure	$4,595 43

REVENUE.

Fees		$80 00
Breakages		1 20
Sale of butter, 18 lbs. at 18 cts.		3 24
" cheese, 8,353 7-8 lbs. at from 5 to 23½ cts.		1,009 78
" fat, 36.16 lbs. at 33 cts.		11 93
" skim-milk, 20,189 lbs. at from 15 to 40 cts.		33 91
" buttermilk, 26,940 lbs. at from 10 to 40 cts.		33 65
Manufacturing butter:—		
2,726.81 lbs. at 3 cts.	$81 81	
14,434.79 lbs. at 4 cts.	577 39	
		659 20
Total Revenue		$1,832 91

POULTRY DEPARTMENT.

EXPENDITURE.

Wages of assistant, stenographer, and temporary assistance	$860 00
Furnishings and repairs	824 14
Permanent improvements	76 49
Purchase of stock	165 21
Fuel, light and contingencies	274 99
Experiments with incubator, fattening and feed	1,986 80
Total Expenditure	$4,187 63
Less Revenue	2,085 62
Net Expenditure	$2,102 01

REVENUE.

Sale of eggs for hatching:—		
241 settings at from 75 cts. to $2	$268 90	
3,047 eggs at from 5 to 7½ cts. each	152 15	
		$421 05
Sale of eggs for domestic use:—		
1,823 1-12 doz. at from 15 to 40 cts.		439 42
Sale of live poultry, 244 live birds for		381 00
Sale of dressed poultry:—		
4,153 9-16 lbs. at from 8 to 15 cts.	$513 30	
926 3-4 lbs at from 20 to 50 cts.	297 70	
15 pairs broilers at from 75 cts. to $1.25	13 75	
11 ducks at 50 cts.	5 50	
3 pairs ducks at $1.25	3 75	
24 squabs at 25 cts.	6 00	
		840 00
Sale of 10 lbs. duck feathers at 25 cts.		2 50
Sale of 100 lbs. grain for		1 65
Total Revenue		2,085 62

HORTICULTURAL DEPARTMENT.

Expenditure.

Permanent Improvements	$298 56
Head gardener and foreman, assistant in plant breeding, assistant and night fireman, teamsters, assistant gardener, stenographer and laborers	5,724 50
Manure, trees, plants, seeds, cold storage experiments, implements, tools, furnishings, repairs and contingencies	1,699 45
Fuel and light	679 72
Wax fruit models	399 81
Purchase of horse	250 00
Total expenditure	$9,052 04
Less Revenue	104 27
Net Expenditure	$8,947 77

Note:—Products supplied to College and Macdonald Hall except when more than required.

Revenue.

Sale of 25 squash for	$ 1 23
Sale of 22¾ crates strawberries at $1.00	22 75
Sale of 83 bus. onions for	59 16
Sale of 2,113 feet rough spruce at $10.00 per M.	21 13
Total Revenue	$104 27

MECHANICAL DEPARTMENT.

Expenditure.

Salary of foreman	$667 00
Tools, furnishings and repairs	198 98
Total Expenditure	$865 98

SOIL PHYSICS DEPARTMENT.

Expenditure.

Services and expenses of temporary assistants in connection with Farm Drainage Demonstrations	$1,000 00

FORESTRY DEPARTMENT.

Forestry contingencies	$1,249 58

SUMMARY, 1909.

	Expenditure.	Revenue.	Net Expenditure
College	$106,078 62	$30,007 31	$76,071 31
Macdonald Institute and Hall	28,204 13	19,074 36	9,129 77
Farm	14,086 01	7,048 07	7,037 94
Experimental	10,026 35	120 00	9,906 35
Dairy	7,317 73	5,122 23	2,195 50
Dairy School	6,428 34	1,832 91	4,595 43
Poultry	4,187 63	2,085 62	2,102 01
Horticultural	9,052 04	104 27	8,947 77
Mechanical	865 98	.....	865 98
Soil Physics	1,000 00	.....	1,000 00
Forestry	1,249 58	.....	1,249 58
	$188,496 41	$65,394 77	$123,101 64

S. SPRINGER,

Bursar and Superintendent.

PART II.

THE PROFESSOR OF ENGLISH.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present herewith my fifteenth annual report for the department of English.

The course in English at this institution is much more thorough and extensive than is generally understood. The character and extent of the course have been arrived at from the experience of many years in teaching the subject with classes in Agriculture. The course now is, I believe, in a fair way of becoming what it should be, namely, both practical and cultural. In the department of English Literature proper, we have the four years' course, consisting of two lectures a week on English authors. The course has for its purpose to make the students acquainted with the chief English authors, so that the works of these authors may become familiar companions to the students who follow the course. This course, besides, gives to the students a fund of ideas of practical or cultural value which make them, to the extent to which those ideas become their own, intelligent and cultured men. Also, a study of these authors cannot fail to widen the vocabulary; and, lastly, the general literary style of the student is, consciously or unconsciously, purified and heightened by a study of the literary styles of our best authors.

The work in Composition also extends through four years. The whole emphasis of this course is practical. By regular and systematic practice in English Composition students are enabled to write with clearness, fluency and force. To make the work practical, however, imposes great labor on the instructors, and is beset with many difficulties. The labor arises from the increasing number of students in attendance. Each man's work must be read and estimated by the instructor, and the work in this direction is exactly proportional to the number of students. The difficulty in teaching the subject arises out of the variety in attainments, especially among the students of the first year. It is extremely difficult to adapt the instruction given to a class of fifty or more students to the particular needs of the individual students, and also difficult to adopt a standard of excellence which is both effectual and just to all the members of the class. In spite of these difficulties, however, I am glad to be able to report real and substantial progress among our classes in the art of composition.

Public Speaking is now a recognized department of instruction and practice in the course in English. Last year there were two classes a week with every second year student during the winter term, and with every third year student three classes a week. These classes were entirely practical, each student, without exception, being required to deliver addresses of five to ten minutes in length as often as time would allow, each student taking his turn on the platform. The instructor limited his duties strictly to general and particular criticism of the work. There was no attempt to give a series of formal lectures on the art of speaking, though incidentally the principles of good platform work were necessarily involved in some of the criticisms. This work, too, is now, I believe, on the right footing, and all that is further needed to make the course quite satisfactory is a sufficient amount of time so that each student shall have practice enough to make him feel

at home on the platform; and an instructor who can give his mind specially to the work. It seems to me that when a College can afford to employ a gymnasium instructor, and the Athletic Society can afford to employ a football coach, the time has surely come when we can afford a coach for Public Speaking. The intercollegiate debates this year have gone by default, partly because of the fact that in previous years our students have been handicapped in competition with the students from other Colleges from the want of sufficient practice and proper coaching. It stands to reason that a special art like Public Speaking deserves special coaching quite as much as does football. I hope that the matter of providing a coach for the Public Speaking classes may receive early and adequate attention.

This year I have been enabled to add to the course in English a series of lectures on Agricultural Journalism. A number of journalists engaged on the Agricultural press of Ontario have kindly agreed to address our students on particular phases of their work, and I hope during the winter term of this year to commence this course. On account of the frequent absence from the College of a large section of the fourth year class in live stock judging, it has been impossible so far to arrange for any of the lectures in this course, but there will be time during the coming winter term.

It gives me much pleasure to commend the work done by Mr. H. H. Lebaw and Mr. G. H. Unwin, as assistants in the department of English. Both are very painstaking and effective, and the success of the work in English very largely depends on their skill and interest in the work.

Respectfully submitted,

J. B. REYNOLDS.

PART III.

THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present my fourth annual report on the work of the department of Entomology and Zoology. The instruction of the students in the subjects prescribed by the curriculum is, naturally, our first and most important duty, and accordingly the greater part of our time is devoted to the lectures and laboratory work and the necessary preparations for them. The increased number of students in the different years has taxed our accommodation to the utmost, and during the current term has compelled us to make two divisions of the Third Year for practical study, one laboratory being insufficient to hold them all. With the able and energetic assistance of my colleagues, Messrs. Tennyson D. Jarvis and Lawson Caesar, a thorough course of instruction in Entomology, both systematic and economic, has been given, beginning with the First Year, continued in the Second, and completed in the Third Year. The students of the Fourth Year who select the Biological Option have a more advanced course in systematic Entomology. There is also given an elementary series of lectures on Zoology in the First Year and in the Fourth Year much time is devoted to advanced work in the laboratory on Zoology, Animal Histology, Physiology and Anatomy. Mr. Jarvis has also given a course on Biology extending over both terms to the Senior Normal students of the Macdonald Institute, and a series of afternoon lectures to the members of the Poultry Short Course, in January, on bird parasites and the outlines of Entomology.

The change regarding Nature Study in the Third Year has proved quite satisfactory. Instead of keeping these students at the College from the middle of April to the end of May, during which time they were expected to receive much of their instruction and to make their observations out-of-doors on birds, small animals and insects, as well as upon the flora of the country, when oftentimes the weather was too inclement for anything of the kind, this year they were permitted to leave at the close of the terminal examinations. They were, however, required to keep a record of natural phenomena in their own neighborhood and to note from day to day their observations of animals of all kinds, of weeds, etc. These note books, together with any collections made, were submitted on their return in September and an oral examination tested their knowledge of common objects. In nearly all cases these conditions were satisfactorily complied with and the relief from a prolonged stay at the College without sufficiently compensating advantages was highly appreciated.

The large class of Normal School students who filled the College after the departure of the men in April gave us a new experience in the teaching of Nature Study. The ninety-four young women who completely filled my lecture room were given a course of instruction on common insects, their general classification, economic importance, and interesting life histories. As ten weeks were spent with us there was ample time for making the course a fairly complete one. Each student was required to collect at least fifty specimens of insects and as far as possible to name them. This work supplemented the lectures and gave an opportunity for individual instruction which, with so large a class, it was rather difficult otherwise to carry out.

It was highly gratifying to note the keen interest that was taken in the lectures and the enthusiasm for the study of the common objects of nature that was gradually aroused. The knowledge acquired and the methods of observation imparted will evidently be of much value to these young teachers in their country schools, and in many a rural district the children may be brought to observe and take an interest in the natural objects that surround them and be guided by their teachers to do so in a useful and satisfactory manner. So far as this department was concerned the experiment tried for the first time this year was fully justified.

The month of July was occupied with the summer school of Ontario teachers who came to us in much larger numbers than in previous years. The shortness of the time and the effort to give instruction in Zoology as well as Entomology, rendered our work less satisfactory than formerly. The increased size of the classes also made out-door instruction more difficult and reduced the amount of individual attention. While we felt our shortcomings and regretted our inability to accomplish all that we should like to have done, it was some compensation to know that our efforts to instruct these teachers were much appreciated by them, and that in many cases they were attracted to the study of nature as never before, and left us with the intention of devoting more time and attention to reading and observation in this wide field of knowledge. After courses of lectures and instruction so long and so varied, those responsible for them were by no means sorry when August came as a month of relief and a much appreciated holiday. It may be mentioned that these prolonged courses of instruction have prevented Mr. Jarvis and myself from carrying out research or field work to any great extent. Mr. Caesar, however, being free from lectures after the conclusion of the regular College course, has been able to visit various fruit growing districts and to complete a variety of experiments in connection with fungus diseases and injurious insects.

At the final examination conducted by the University of Toronto for the degree of B.S.A. in May last, all the Fourth Year students, who had selected the Biological Option, were successful. Of these Mr. W. Robin Thompson ranked highest in general proficiency and obtained first-class honors in the major subjects of the Fourth Year, thus winning the prize of $10 in books. Mr. Thompson has since been appointed to take charge of the work at Melrose Heights, Mass., connected with the importation and breeding of Dipterous Parasites for the control of the Gypsy and Brown-tail moths—a position of considerable importance and much responsibility. Mr. A. Eastham, who came second in the final examinations, has been appointed temporary assistant in the Botanical Department of this College. Mr. R. C. Treherne is employed by the Ontario Department of Agriculture as one of the Provincial Inspectors of Nurseries. Mr. E. W. Stafford is in charge of Insectary work at the Agricultural Experiment Station, St. Anthony Park, Minn., and Mr. G. H. Cutler has been appointed assistant Agronomist at Macdonald College, Ste. Anne de Bellevue, P.Q. It is very gratifying to find that year after year our students obtain excellent positions immediately after completing their College course, and still more satisfactory to learn, as we do, that they are well equipped for their work and perform the duties assigned to them in a thoroughly efficient manner.

Of the present Fourth Year students only three are taking the Biological option; they have all selected Entomological subjects for the theses that they are required to present at the close of next term and are now carrying on the scientific investigations that are necessary for the completion of their tasks. Mr. Roy Fraser is studying the Cynipid Galls of Ontario; Mr. J. D. Tothill, the Dipterous flies of the super-family Muscoidea; and Mr. S. J. Neville the Water Mites (Hydracnidæ).

In the Second Year about twenty of the students have selected Entomological subjects for their theses, and have consequently referred to us for assistance in outlining and planning their work.

Outside Lectures.

Besides the regular courses of lectures in College, we, in common with many other members of the staff, are called upon to address audiences in other places; lectures of a popular and practical character were accordingly given in January at Brampton and to those attending the Stock Short Course here; in February to the Canadian Institute, Toronto; in April at St. Thomas's Church-house, Toronto, and in June to the Lambton Teachers' Association.

Mr. Jarvis in January gave an address before the Canadian Institute, Toronto, on "Gall Insects," and a lecture to the Short Course in Horticulture on "Insect and Fungus Diseases of Fruit Trees." In November he addressed the Canadian Horticultural Association at its annual meeting in Toronto on "The Relative Value of Insecticides."

Mr. Caesar has given a number of addresses on Insects and Diseases Affecting Fruit Trees and other Cultivated Plants at Picton (2), St. David's (2), Crowland (2), Humberstone (2), Lindsay, Beamsville, Stoney Creek, Port Perry (2), Cobourg (2), Trenton, Whitby (2), Dunnville, Forest (2), Simcoe, Broadview Boys' Institute, Toronto; and addresses to the American Pomological Society on "The Control of the Codling Moth," and to the Fruitgrowers' Association at its November Convention in Toronto on "Lime-sulphur Wash *vs.* Bordeaux Mixture for Summer Spraying of Apple and Pear Orchards." Orchard demonstrations with addresses were given at Oshawa, Ayr, and New Hamburg, and a visit was made to Collingwood to investigate an outbreak of Wireworms.

Publications.

In April Bulletin 171 on Insects and Fungus Diseases affecting Vegetables (64 pages, 58 illustrations) prepared in co-operation with Messrs. J. W. Eastham and J. E. Howitt, the lecturers in Botany, was published by the Ontario Department of Agriculture. In addition to editing the monthly issues of the *Canadian Entomologist* and the Annual Report to the Legislature of the Entomological Society of Ontario, I have contributed a number of short articles in answer to enquiries in the *Farmer's Advocate* and other journals, and a paper on "Some of the Injurious Insects of 1909 in Ontario" to the Report of the Entomological Society. In the Transactions of the Royal Society of Canada has been published my ninth annual "Bibliography of Canadian Entomology."

Mr. Jarvis, who has been re-elected President of the Entomological Society of Ontario, has contributed to its Annual Report articles on "the Scale Insects of Ontario"; "Further Notes on Gall Insects"; and "The Mites (Acaridae) of Ontario"; and has furnished short articles bearing on Economic Entomology to the *Canadian Horticulturist* and other publications.

Mr. Caesar has contributed the following articles: "The Shot-hole Borers" and "The Pear and Cherry Slug," to the Grimsby *Fruit-grower;* "The Codling Moth" to *Farm and Dairy;* "The Lesser Apple Worm" and "Yellow Disease of Asters" to the *Canadian Horticulturist;* the latter paper was also published by the *Canadian Florist;* "The Control of Blister Mites and the Codling Moth" to the *Farmer's Advocate.* In addition to these papers he has prepared in conjunction with the

Chemistry department Bulletin 177 on the Lime-sulphur Wash, which has been published. This bulletin furnishes an up-to-date account of the various Insect Pests and Fungus Diseases that may be controlled by the application of the wash, together with full information for the treatment of each, and many illustrations from original photographs.

Fall Fairs, Meetings, etc.

During the farmers' excursions to the College in the month of June, Mr. Jarvis took charge of the bureau of information and replied to numberless questions regarding injurious insects, weeds, etc., specimens of a large number being laid out for inspection.

At the request of the Superintendent, Mr. Jarvis visited the Mimico Asylum in order to investigate the unsatisfactory condition of many of the ornamental shade and fruit trees on the premises. He found that some failures in growth were caused by the character of the soil, and in many instances injury could be traced to the attacks of insect pests.

He also visited the estate of Dr. Robinson at Inglewood, County of Peel, in order to inspect the apple orchard and give information regarding its cultivation and treatment for insect and fungus injuries.

As in former years, exhibits of the most important injurious insects, fungus diseases, noxious weeds and weed seeds were sent to the following fall fairs: Lindsay, Picton, Simcoe, St. Catharines, Morrisburg, Winchester, Peterborough, Galt, Richmond, Carp, Roblin's Mills and Norwood.

Mr. Caesar, who took charge of the exhibits, supplemented the collection in some instances by gathering specimens from the neighboring orchards and fields of insect injury, fungus disease and weeds. He thus interested to a much greater extent the people of the neighbourhood and took the opportunity of impressing upon them the necessity of adopting the best methods of controlling these pests. A large exhibit was also made at the Toronto National Exhibition in connection with other departments of the College.

The Entomological Society of Ontario held its 46th annual meeting here on November 4 and 5, under the presidency of Mr. Jarvis. The usual popular lecture was given in Massey Hall by Dr. C. Gordon Hewitt, the successor as Dominion Entomologist of the late Dr. James Fletcher. His subject was "House Flies and Their Allies," illustrated with very beautiful and scientifically accurate lantern pictures. It is a great satisfaction to the members of the Society and others interested in the subject that a man so thoroughly well qualified by education, experience and training has been appointed to fill this important position in connection with the Experimental Farms of the Dominion.

At the annual meeting on November 8th of the Guelph Horticultural Society, your Professor of Entomology was elected President. This department will thus be brought into closer touch with the various works of the Society and the enthusiastic lovers of flowers who are keenly desirous of rendering the city of Guelph an attractive and beautiful place to live in.

Correspondence.

Injurious Insects and Remedies. The number of letters received by the staff of this department from farmers and fruit growers and from the general public has greatly increased during the past year; enquiries respecting insect pests and

fungus diseases of plants have come in almost daily and have been at once replied to. During the greater part of the season the most numerous complaints were made respecting Aphids, which this year seemed to attack almost every cultivated plant. Serious outbreaks were reported on Apple, Plum, and Cherry trees, Currant bushes, Elm, Basswood, Birch, Maple, Copper-Beech, Hawthorn, Privet, Fir and Spruce, Roses, Asters, Ferns, Cabbage, Turnips, Lettuce, Potatoes, Peas, Wheat, etc. In many cases the "honey-dew" falling from the colonies of aphis on large trees caused all the lower leaves to shine as if varnished, and attracted swarms of flies and other insects. Lady-bird beetles and their larvae, which feed upon Aphids, were unusually abundant also and helped to a large extent to reduce the numbers of the pests.

Next to the Aphids, Wireworms and White Grubs were most frequently complained of. For these underground root feeders little can be done as a direct remedy, but their breeding places in old pastures and grass fields should be broken up and the insects prevented from developing by a short rotation of crops. Deep plowing of affected areas late in the fall and again in early spring will break up their winter quarters and expose them to the weather and their various enemies. Hogs will turn up and devour them greedily and should be allowed to root up any field where the grubs are abundant.

Grasshoppers, which also breed in old pastures, especially where the soil is dry and sandy, were very abundant this year and did a great deal of damage to oats and other crops. In the Bruce Peninsula and the country around the Georgian Bay, they were extremely destructive. Rocky land, which cannot well be plowed, served as a convenient breeding place, and dry, hot weather favored the increase of the grasshoppers. Tree-planting in such places, where crops cannot be grown, would in the course of time become a permanent remedy.

Many enquiries were made regarding scale insects; the Oyster-shell and the San Jose attracted most attention. A new centre for the latter has been discovered in Prince Edward County; prompt measures should be taken for its extermination. In the Niagara fruit district spraying with the lime-sulphur wash has become very general and orchardists have learnt its value, but in the southwestern part of the Province much carelessness prevails and this most pernicious scale is allowed to increase and spread without much attempt to check it. A few years of this neglect will work widespread destruction amongst the fruit trees of that part of the country and the plague will soon extend to the counties contiguous.

The Elm-tree Scale (*Gossyparia spuria*) which was reported from Toronto last year, has this year been found widely distributed and very abundant in the northern part of the city. The Cottony Maple scale has also made its appearance in Toronto, and been reported from Fonthill and Welland and several other localities. It is to a large extent a town insect, infesting shade trees lining streets, and usually increases in numbers for several years till it becomes a veritable nuisance and then rapidly disappears, owing its destruction to its parasitic enemies, atmospheric effects and other causes. The Terrapin scale has again been sent in from St. Catharines and also from Chatham. The Scurfy scale and a Lecanium on grape vines are the only others to which our attention has been drawn.

Information is constantly asked for respecting the Buffalo Carpet Beetle and how it may be got rid of. Various other domestic insects such as Bed Bugs, Fleas and Cockroaches, have caused much annoyance in several places. In the Cobalt region and all through Northern Ontario, Black Flies are an intolerable nuisance; the larvae live in swiftly running rivers, attached to rocks over which the water is

dashing, and consequently it seems impossible to do anything to interfere with their breeding and multiplication.

The Corn-ear Worm (*Heliothis armiger*) was found by a market gardener on the outskirts of Toronto, in some ears of green corn imported from Florida, and caused him much alarm, as he feared that a new kind of injurious insect was likely to be established amongst us. It has, however, been known for years as an occasional trouble in Ontario, not only spoiling ears of corn, but also boring into green tomatoes and devouring the foliage of tobacco plants. It is essentially a southern insect and is best known as the Cotton Boll-worm; there is no likelihood of its becoming a serious plague in this country. As in so many other cases clean cultivation and the burning up in autumn of all refuse from the corn and tomato plants is the best method of preventing the increase and spread of the insect. If this is not attended to, a safe refuge is afforded during the winter months for a variety of pests which hibernate wherever shelter of this kind is provided for them.

The Carrot Rust-fly (*Psila rosae*) has only recently been found in Ontario, having gradually spread to us from the Maritime Provinces where it has become a somewhat troublesome pest. It is a European insect accidentally imported about five and twenty years ago. The maggots of this fly destroy the roots of carrots, parsnips, and celery after they have been stored for the winter, and another brood burrows into the roots of the young plants in early summer, causing rusty blotches to appear and a rot to set in. The first indication of the attack is the change of the young foliage from green to reddish, denoting the sickly condition of the plant. Where this insect is found, late sowing seems to be the best remedy.

Insects affecting fruit trees are being reported upon by Mr. Jarvis and Mr. Caesar, and need not therefore be referred to here.

A great deal of correspondence was carried on by Mr. Jarvis in the Zoological department on the identification of birds and the preservation of bird skins. There were also numerous questions asked and enquiries made respecting lung-worms, tape-worms, hair snakes, trichina, round worms of man and mammals, malaria fever protozoan, slugs, sow-bugs, millipedes, fish, frogs, snakes, turtles, mice, moles, etc.

Experiments Conducted by Mr. Jarvis.

Control of the Codling Moth. It has been found by experiments made during the spring and summer months of the present year on the Jarvis Fruit Farm in the Grimsby district that spraying with a solution of arsenate of lead as here directed is most effective to destroy the Codling Moth.

The arsenate of lead used was what is commonly known as the Vanco brand manufactured by the Toronto Chemical Company. It is sold in hundredweight kegs to those who require large quantities. It is however also put up in smaller packages. The quantity used was 2 lbs. to each forty gallons of water. The liquid was first strained through a wire gauze strainer to reduce the particles and so prevent any clogging at the nozzle.

In order to render the solution effective it should be applied with considerable force at constant pressure so that the liquid may enter the inner calyx cup of the young fruit where the young larvae mostly begin their feeding. Hand sprayers therefore are not always recommended as most effective because the pressure is not sufficiently strong at their best, besides there is a varying of the pressure if produced by hand. In these experiments a Gould sprayer, manufactured at Seneca Falls, N.Y., was used. It gives a constant pressure of about 200 lbs., and can be manipulated with the greatest ease and safety.

The experiments were carried on in three orchards; one of six acres of Greenings, one of ten acres of Baldwins, and one of two acres of mixed varieties. The first two received sprayings but not the last. The first spraying was done to the trees of the first two orchards with a Bordeaux nozzle, commencing June 4th, the time when the young fruit is just forming and the inner calyx cup can be easily reached, the spraying being principally aimed at the blossoms. The second spraying was done in the six-acre orchard about the 25th day of June last with a Friend nozzle, which gives a mist spray, the spraying being aimed at both the leaves and blossoms.

The result was that the six-acre orchard produced fruit being about 99 per cent. free from worms, the ten-acre orchard, sprayed once, produced fruit being about 70 per cent. free from worms, and the two acres unsprayed produced fruit being about 20 per cent. free from worms.

To make the experiment more varied a row of trees between the six-acre and ten-acre orchards was left unsprayed. The fruit on this row showed only 20 per cent. free from worms. It was further noticed that the sprayed row of Greenings a few yards away was almost free from worms.

Control of the Potato Beetle. For the purpose of finding out the strengths of arsenate of lead and of Paris green necessary for the destruction of the potato beetle, experiments were made by Mr. Jarvis upon eight plots, each containing two hundred potato plants. The plants were full grown and badly infested. Before spraying one plant was selected out of each plot and the larvae on it were counted. A hand sprayer was used and the spraying was done on the 19th day of July, 1909.

The subjoined table sets out clearly the results of these experiments and the relative effectiveness of arsenate of lead and of Paris green. It will be seen that either 3 lbs. of arsenate of lead to forty gallons of water, or ½ lb. of Paris green to a like quantity of water is sufficiently strong to kill the larvae and any larger quantity used is only wasted. The arsenate of lead used was the Vanco brand from the Toronto Chemical Company.

Kind of Arsenical used.	Quantity used per 40 gals. of water.	No. of larvæ on marked plant.	Larvæ destroyed at end of 24 hours.	Larvæ dead at end of 48 hours.
Arsenate of lead.....	1 lb.	20	1	3
" "	2 lbs.	21	5	18
" "	3 "	27	17	27
" "	4 "	11	4	11
Paris green.....	4 ozs.	19	3	14
" "	8 "	14	7	14
" "	12 "	13	8	13
" "	16 "	12	7	12

Experiments Conducted by Mr. Caesar.

Cockroaches or Croton Bugs (*Ectobia germanica*). For some years in spite of sporadic efforts to control them, the Croton Bugs had been increasing in certain parts of the College residence. In December, 1908, Mr. Caesar was requested by the President to take the matter in hand. After preliminary tests with one of the commonly recommended remedies, a trial was made of Peterman's Roach Food. The results were so good that no other remedies were tested. Roach Food is a powder containing a considerable amount of phosphorus along with other substances.

It is put up in small tin cases, each of which is supplied with a perforated top for dusting the powder through. Before applying it the rooms should be carefully swept and cleaned; the powder should then be dusted liberally around the walls and in dark, moist places where the roaches most abound. It should be left here for five or six days before sweeping up, after which a second application should be made and this again left as long as the patience of the housekeeper will permit. The powder does not lose its value through exposure to the air in this way, and seems to be just as attractive at the end of a week as on the first day. Two thorough applications were found sufficient to destroy almost all the insects in the room treated.

Usually one hesitates about recommending a patent remedy, but this is so easy to apply and has given such satisfactory results that it deserves our commendation. Two applications to seven fair-sized rooms cost about four dollars.

Leaf Blister Mite (*Eriophyes pyri*). As there are many farmers who do not know this insect a brief description of it seems desirable.

The Blister Mite is a very tiny, whitish creature, so small that a single individual is not visible to the naked eye. It attacks the leaves of the pear and apple throughout the season and causes numerous little blisters or swellings here and there over the surface. These are most conspicuous on the underside of the leaf. They gradually become reddish brown in color on apple leaves, and almost black on pear, and are thus visible for some distance on badly infested trees. The mites desert the leaves in fall and pass the winter under the bud scales. It is only while here that they can be successfully treated.

As no badly infested trees were found near the College, two pear trees of about 14 years of age near Mono Road that had last season been observed to be very badly attacked, were selected for the experiment. On May 11th the trees were sprayed with commercial lime-sulphur of the strength of 1 to 9. As the day was very calm both sides were sprayed at the same time.

In July and again on August 26th, the trees were examined, but no blisters could be found on any of the leaves. As the bud scales had been closely observed just before the spraying and numerous mites were found under them, and as the apple trees about 10 rods away were much worse attacked this year than last, it was quite evident that the lime-sulphur had been very successful.

Mr. J. H. Hare, B.S.A., agricultural representative at Whitby, co-operated with Mr. Caesar in this experiment, and found that the home-boiled lime-sulphur gave good results against the mites on apple trees. He also tested kerosene emulsion, but reports that this did not give so good results as the lime-sulphur.

Codling Moth (*Carpocapsa pomonella*). For some years many of the apple growers of the Niagara district have had such poor results from their efforts to control the Codling Moth by spraying that they have formed the opinion that the pest cannot be controlled in this way. Having learned of this state of affairs, Mr. Caesar decided to select an orchard of 5 or 10 acres in that district this spring and make a thorough test of spraying. While searching for such an orchard he, along with Mr. Crow, of the Horticultural department, was requested by Mr. P. W. Hodgetts, of the Horticultural Branch of the Ontario Department of Agriculture, to spray Mr. Joseph Tweddle's orchard at Stoney Creek. Mr. Crow was unable to take part in the work, so Mr. Caesar took it alone. The orchard contained 25 acres, and the trees average about 30 years of age, although many of those at the northern end were 50 years old and very high, never apparently having been headed back.

Two Friend spray machines were used with double-acting pumps, and with tanks each holding a little more than 160 gallons. Each spray waggon was also equipped with a tower about eight feet high. The man on the tower did all the spraying in each case. He used an eight-foot extension rod and two Friend nozzles attached to a V, the hole in each nozzle being considerably larger than usual. The object of this was to secure a coarse strong spray which could be driven forcibly into the calyx cavities of every blossom. Between the V and the extension rod a small brass elbow with an angle of about 45 degrees was inserted. The object of this elbow was to enable the sprayer to control the direction of the spray so that he could force it straight into the blossom end of the tiny fruit and thus cover every portion of the cavities at that part. Without the elbow this is scarcely possible. The elbow can be obtained from the Spramotor Co., London, for 20 cents. Two men worked each pump and an effort was made to maintain a pressure of at least 140 pounds.

The first spraying was begun June 5th, at which date nearly all the blossoms were off the Astrachan trees and other early varieties and most of them were ready to fall from the later varieties. For this spray arsenate of lead alone, 2 lbs. to 40 gals. of water, was used. To make sure that every blossom end was thoroughly covered with the poison it was found necessary to drench the trees. From 8 to 16 gallons were used on each of the larger trees. The first side was finished June 7th. As the wind failed to change, the other side had to wait until June 10th. This side was finished June 12th, but on account of the enforced delay a considerable number of the calyces had closed, especially in the upper end of the orchard, before the spraying could be finished.

It was thought wise to spray the orchard a second time for the Codling Moth. The date this time was determined by looking for the eggs and observing when they began to hatch in considerable numbers. This was found to be the case about three weeks after the beginning of the first application, that is, June 24th. Next day, June 25th, the spraying was begun; both sides were finished by June 29th. For this application Friend nozzles and the elbow were again used but new plates with holes only half the size used in the former application were placed in the nozzles. A pressure of about 160 lbs. was maintained throughout. As the object of this spraying was simply to cover every leaf and fruit thoroughly and not to drive the spray into the calyx cavity, only about half the amount of material was found necessary, that is, from 4 to 8 gallons to the larger trees, compared with 8 to 16 in the previous application. The mixture used this time was self-boiled lime-sulphur: 10 lbs. lime and 10 lbs. sulphur, boiling water being used to slake the lime, and the mixture then being diluted to 40 gallons of water; to this amount, 2 lbs. arsenate of lead was added. The lime-sulphur was used simply to control the Apple Scab; a previous application of this had been given but has not been referred to, as it did not have any bearing on the Codling Moth. The spraying with arsenate of lead between June 4 and 12 was to put the poison into the calyx cup so thoroughly that whenever a worm entered the fruit at this point at any time throughout the season the poison would be there and would kill it. The second spraying, June 25 to 29, was intended to kill the tiny worms that tried to enter the apple from the side or at any other place than the calyx end, and also any that might feed to some extent on the leaves before reaching the fruit.

Mr. Caesar did the spraying himself on one tower and Mr. Tweddle on the other, both doing the work in the same way.

On July 28 and 29, when the first brood had nearly all entered the fruit and some of the larvae of this brood had already emerged from the fruit and were to be found under the bands, the orchard was examined. Several neighboring un-

sprayed orchards were also examined at the same time, and it was discovered that 66 per cent. of this brood in these unsprayed orchards had entered the calyx end. In the sprayed orchard 15 trees of several varieties in the lower half were examined before any worms were found to have entered the calyx end. In the upper half, where a number of the calyces had closed before the spraying could be finished, a small percentage had done so. In the lower end at least 99 per cent. of the apples were free from worms, in the upper, 95 per cent. A considerable number of worms that had begun to enter from the side of the apple had died before getting any distance.

At this date, July 28 and 29, the Red Astrachan apples were beginning to ripen and a fair price having been offered for these at a nearby canning factory, the men were shaking the ripest off the trees. These and any already on the ground would naturally be the wormiest apples. As soon as they were shaken off Mr. Caesar examined the fruit under each of nine of these trees in the centre of the orchard. 100 apples were counted under each side of the tree, every apple, no matter when it had fallen, being counted. The results were as follows:

Tree No. 1, 97 per cent. clean; No. 2, 90 per cent.; No. 3, 94 per cent.; No. 4, 92½ per cent.; No. 5, 95½ per cent.; No. 6, 95½ per cent.; No. 7, 93 per cent.; No. 8, 96 per cent.; No. 9, 99 per cent.

On September 13th the trees were again examined. An examination of the bands on unsprayed orchards showed that the second brood had ceased to emerge. This examination showed considerable increase of wormy apples. A careful estimate of the condition of the fruit at each end of the orchard showed that apparently 90 per cent. of the apples were free from worms in the lower end and from 75 to 80 per cent. in the upper end. It should have been mentioned that the trees at this end were very large, and this in addition to a considerable number of the calyces having closed before the first spraying could be finished probably accounts for the greater percentage of wormy apples found here.

Being unable to be present when the apples were being picked, Mr. Caesar asked Mr. Tweddle to keep account of the percentage of clean fruit. Early in November Mr. Tweddle reported that in the lower half of the orchard 96 per cent. of the apples on the packing tables were free from worms, and 88 per cent. in the upper half. This, however, does not take into account the percentage of wormy fruit on the ground. Neighboring unsprayed orchards had from 50 to 95 per cent. of wormy fruit, and this orchard itself last year had more than 50 per cent. The main result of the experiment is that Mr. Tweddle himself and all those who have examined the orchard are convinced that the Codling Moth can be kept under control by spraying thoroughly at the right time. Equally good, and in some cases better results have been obtained by two or three other fruitgrowers this year in other parts of the Niagara district. In addition to the spraying experiments Mr. Caesar devoted considerable attention throughout the season to studying the life-history of the Codling Moth. This study will be continued next season. Further experiments in Codling Moth control in badly infested districts will also be undertaken and it is hoped that by the end of the year we shall be in a position to embody the results of the experiments and study of the life-history in a practical and comprehensive bulletin.

Oyster-shell Scale (*Lepidosaphes ulmi*). Experiments conducted by Mr. Caesar in 1907 demonstrated that the home-boiled lime-sulphur wash, 20, 15, 40 formula, applied to the trees shortly before the leaf-buds burst was a good remedy for Oyster-shell Scale. Observations since that date and information obtained from various sources, especially during his institute work, have shown that this

is still on the whole the most satisfactory treatment for this insect. A badly infested orchard is seldom or perhaps never freed from the scale in one season by this wash, but if it be applied in spring for two or three successive years the results are most satisfactory.

Tests last year and again this year with commercial lime-sulphur show that this form of the wash also destroys many of the insects, but it has not been quite so satisfactory as the home-boiled in the experiments.

Commercial lime-sulphur of the strength of 1 to 30 and also of 1 to 40 applied in June just after the eggs had hatched and the young insects had ceased to run destroyed a high percentage of them and should supplement the spring wash wherever it was felt to be necessary to do so. Of course kerosene emulsion at this time of the year, if the fruitgrowers would use it, would give as satisfactory results as any spray mixture, but for some reason they will not use it so readily as lime-sulphur, especially commercial lime-sulphur. Moreover, the latter has a strong fungicidal value that kerosene emulsion has not.

In many orchards, especially east of Toronto, caustic soda (Gillett's lye) has been used to combat Oyster-shell Scale. The strengths used have varied greatly, and as conflicting claims have been made about its merits, Mr. Caesar and Mr. J. H. Hare co-operated in testing this wash at various strengths. In each case the wash was applied early in April before the buds had begun to swell.

Different amounts of the substance were used, varying from 4 cans of Gillett's Lye up to 13 cans to 40 gallons of water. The results obtained by both experimenters showed that to be of any real value against the scale the wash had to be very strong. Mr. Caesar found that 13 cans, which contain approximately 10 lbs. of caustic soda, each can containing only about 12 ounces, was necessary to give fairly good success. At this strength about 85 per cent. of the eggs were destroyed. Mr. Hare did not test so high a strength as this, but found, like Mr. Caesar, that strengths up to 6 lbs. did but little good.

At a strength of 10 lbs. (13 cans) to 40 gallons of water, no injury was done to the trees. We do not, however, advise the use of caustic soda because it is much more expensive at the above strength than lime-sulphur and because it has not got the same value as a fungicide and insecticide as the latter; for instance, it failed to destroy the Blister Mite in tests made by Mr. Hare. If it is used it should be in the proportion of 10 to 11 lbs. to 40 gallons of water and must be applied early in spring while the buds are still dormant.

No tests were made of the value of this wash when lime was added to it. Doubtless from 20 to 40 lbs. of freshly slaked lime would help greatly to make the weaker strengths of value, lime itself being of considerable value against scale insects if the trees are well coated with it.

A summer application of 2 lbs. caustic soda to 40 gallons of water applied just after the insects had all hatched gave poor results, not nearly so good as commercial lime-sulphur.

Apple Scab (*Venturia inaequalis*) and Commercial Lime-Sulphur. In order to get definite knowledge of the value of commercial lime-sulphur as a means of controlling Apple Scab, Mr. Caesar chose a row of Snow apple trees about twenty years of age in the College orchard and sprayed these as follows with the Vanco brand of commercial lime-sulphur: 1st, just before the blossoms opened, strength 1 to 25; 2nd, just after blossoms had fallen, 1 to 40; 3rd, three weeks later, 1 to 40.

The second spraying had to be omitted on the east side, owing to Mr. Caesar's enforced absence on other experiments. The spraying was very thoroughly done in every case.

Results: The west side, which had received the three sprayings, gave fruit 99 per cent. free from Scab; east side, where the second very important spraying had to be omitted, 85 per cent. free from Scab. None of the fruit was russeted and the foliage was uninjured except by the first spraying at the strength of 1 to 25, which burned the leaves a little around the tip.

This experiment, along with the results obtained by several fruitgrowers this season, shows that Apple Scab can be controlled by commercial lime-sulphur in the same way as by Bordeaux mixture. Lack of time alone prevented Mr. Caesar from making comparative experiments with Bordeaux mixture.

Pear Scab (*Venturia pirina*) and Commercial Lime-sulphur. Commercial lime-sulphur was also used in experiments for the control of Pear Scab on Flemish Beauty trees. The trees were sprayed as follows: 1st, just before the buds began to burst, strength 1 to 9; 2nd, just after the buds had burst, but before the blossoms had quite appeared, strength 1 to 25; 3rd, just after the blossoms had fallen, strength 1 to 40; 4th, nearly 3 weeks later, strength 1 to 40.

In all of these applications the work was thoroughly done.

Results: On both sides of the trees the fruit and leaves were absolutely free from Scab, whereas all surrounding trees had a considerable amount of it on both fruit and leaves. These trees had received three applications of Bordeaux but had not received the early one before the buds burst, which seems to be a very important application. Once more the strength of 1 to 25 was found to burn the leaves slightly but they were quite uninjured at 1 to 40.

The experiments showed very clearly that it is quite possible to control Pear Scab even on Flemish Beauty trees with lime-sulphur.

Black Rot Canker (*Sphaeropsis malorum*). Mr. Caesar made a trip to Whitby early in spring to perform some experiments on the value of cutting out, disinfecting and painting Black Rot Cankers on the trunks and large branches of apple trees. Owing to the absence of the owner of the selected orchard he was unable to do the work himself but explained to Mr. J. H. Hare the method he would adopt, and the latter kindly did the work for him a few days later. Since that date members of the College staff and Mr. Hare have visited the orchard and report excellent results, the diseased areas having been completely removed and the trees having made splendid growth. Similar results have been obtained by fruitgrowers in Prince Edward County. Mr. F. Dempsey and others from that county report that when the cutting out of cankers is supplemented by spraying the orchard in spring before the buds burst, with home-boiled lime-sulphur, followed by two or three later sprayings with Bordeaux, at the same dates as for Apple Scab, no new infections have taken place. Commercial lime-sulphur may be used in place of Bordeaux if desired.

Results: The results of the work done in various places seem to show that this dread disease can be very successfully controlled by the following method:

(1) Thoroughly prune the orchard early in spring, cutting out all dead branches and burning these lest they spread the disease.

(2) Cut out wherever possible cankers found on the trunk or main branches, taking special pains to see that all the diseased bark is removed. A draw-knife is handy for this purpose. Then disinfect the wounds with corrosive sublimate of the strength of 1 to 1,000, and paint carefully with white lead free from turpentine.

Caution: Corrosive sublimate is deadly poison if taken internally. It should not be used in tin or iron vessels, as it corrodes them, but only in wooden or glass vessels. These must be carefully washed afterwards.

(3) Spray all apple and pear trees at least three times: 1st, in spring before the buds burst, using home-boiled lime-sulphur or Bordeaux; 2nd, just before the blossoms open; 3rd, just after the blossoms have all or nearly all fallen.

For the second and third sprayings either Bordeaux mixture or commercial lime-sulphur may be used and special pains must be taken to see that the bark of the trunk and main branches is thoroughly covered, because in spraying it is often only the foliage and fruit that get attention, the bark being overlooked.

When time permits a fourth application with the same mixture two or three weeks after the third will be found helpful.

Early in the season, at the request of Mr. Caesar, Mr. Alfred Eastham was appointed by the Department of Agriculture to make a special laboratory and field study of the fungus that caused the Black Rot Canker. Unfortunately Mr. Eastham was able to devote only about two months to this work when he was forced to resign in order to prepare himself for his present position on the Botanical staff of the College. His report will soon be ready for publication.

Gum Diseases of Peach Trees. Further study of the gumming of peach trees that was very common last year and to a much more limited extent this year, shows that the experiments conducted last year were not carried sufficiently far and that, while inoculations of the trunk and branches with the spores of Brown Rot (*Sclerotinia fructigena*) produced typical gum exudations, this cannot be considered the cause of the gumming as a whole. The wood around many freshly formed gum masses was carefully cut out and cultures made from the diseased part, but in most cases no organism could be found present; in other cases where an organism did grow in any of the media, inoculations with it failed to produce the gum exudations. Up to the present, therefore, we have no proof that gumming is due to an organism.

The Museum.

The Biological portion of the Museum has been increased by the purchase of colored casts, natural size, of eight varieties of fishes, reptiles and frogs; enlarged anatomical models of a Star-fish, Clam, Crayfish, Frog, Perch and Leech; mounted skeletons of a Cat, Pigeon, Snake, Turtle, Frog and Perch; specially preserved dissections of a Sea Anemone, Star-fish, Sea Urchin, River Mussel, Sea Cucumber, Crayfish, Squid and Frog; a teaching collection of twenty-nine models and dissections of typical forms of invertebrate animals; and thirty mounted specimens representing the principal divisions of the invertebrata and a few of the smaller vertebrates. The whole collection is not only of much interest to visitors to the Museum, but is also most useful in illustration of the lectures in Zoology, especially to those taking the higher course in the Biological Option.

During the summer months a student was employed in collecting specimens of insects, etc., for class-room work and in attending to the breeding experiments in the Insectory.

Apparatus.

During the past year the equipment of this department has been increased by the purchase of the following articles: A hand Microtome; five Continental Microscopes (seven were procured during the preceding year); one Binocular Microscope; some high-power objectives; a large laboratory Incubator; several dozen Riker mounts for lecture and exhibition purposes; a set of thirty hand-painted diagrams of insects by Dr. Fyles; and about 80 of the Slingerland lantern slides.

Respectfully submitted,

CHARLES J. S. BETHUNE.

PART IV.

THE PROFESSOR OF BOTANY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit the third annual report on the work of the Botanical department.

There has been one change in the personnel of the staff. In July, Mr. J. W. Eastham entered on a year's special course at Cornell University, Ithaca, N.Y., in the department of Plant Pathology, on leave of absence. His place is taken by Mr. A. Eastham, B.S.A., of the class of '09. Investigation on the Black Rot Canker was carried on by Mr. A. Eastham during the season, and his report is included herewith.

During the year several new miscroscopes were added to our equipment. With the large increase in the number of students in the Junior Year the supply, however, is still inadequate. We plan to continue to make additions from year to year as available funds warrant. Purchase was also made of a number of botanical charts and models needed in the work of teaching.

Owing to the increased interest in the detection of the seeds of noxious weeds, we prepared a special weed seed collection for selling at cost to farmers and merchants. These are described more fully elsewhere. There has been a very lively demand for them.

Owing to the development of work in the Nature Study Department consequent on the establishment of Teachers' Normal Classes, the organization of a Schools' Division of the Experimental Union and the commencement of a Schools' and Teachers' publication through the medium of the O.A.C. Review, I have found it necessary since the spring to leave the work of this department more and more in the hands of Mr. J. E. Howitt. I take pleasure in stating that he has met his increased work and responsibilities cheerfully and successfully. He has had charge of the special correspondence regarding weeds and weed seeds and also of some experimental work dealing with the treatment of weeds by spraying.

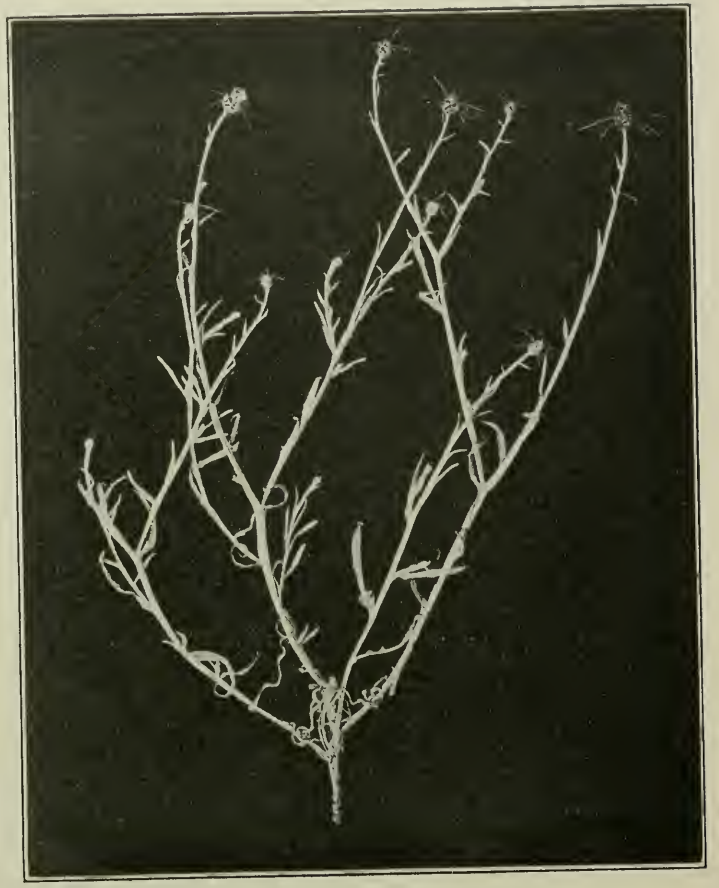
The remainder of the report dealing with these matters is prepared by him.

CORRESPONDENCE.

During the past season of 1908-1909 the number of letters received concerning weeds, weed seeds, and fungus diseases has been twice that of any one of the previous three years. The most marked increase is noticed in the number of samples of alfalfa, clover and timothy seed sent to the department to be tested for purity. This increased interest on the part of the farmers in pure seed is without doubt the result of the Weed Seed Control Act of 1905, which has been slowly instructing the farmers in the matter of pure seed and to the fact that pure seed is their right by law.

Judging by an analysis of the correspondence received during the past twelve months the following have been the most troublesome weeds for the season of 1908-1909: Perennial Sow Thistle (*Sonchus arvensis*); Dodder (*Cuscuta sp.*); Field Bindweed (*Convolvulus arvensis*); Field Mustard (*Brassica arvensis*); Wild Vetch or Wild Tare (*Vicia cracca*); Bladder Campion (*Silene latifolia*); Ground Cherry (*Physalis viscosa*); Stinkweed or Penny Cress (*Thlaspi arvense*);

Roquette, a new mustard in Ontario.



Barnaby's Thistle (*Centaurea solstitialis L.*).

Quack Grass (*Agropyron repens*); Wormseed Mustard (*Erysimum cheiranthoides*); Ox-eye Daisy (*Chrysanthemum leucanthemum*); Wild Oats (*Avena fatua*); Ragweed (*Ambrosia artemisiaefolia*); Horsetail or Scouring Rush (*Equisetum arvense*).

The Perennial Sow Thistle is still on the increase in Ontario, and many farmers are quite discouraged by it, claiming that it is impossible to eradicate it. It can, however, be eradicated by proper and thorough cultivation at the right season of the year, combined with the use of a well cared for hoed crop or smother crop. Many farmers report that they have been able to clean their fields of this pest by thorough after-harvest cultivation followed the next season by a bare summer fallow until it was time to sow fall wheat. Such a method is of necessity only effective when the fallow is thoroughly and repeatedly cultivated throughout the entire season so that the "roots" are broken up, the tops kept down, and the pest thus starved out. The discouraging thing about attempting to eradicate this pest is the fact that the seeds are blown about so freely by the wind that one neglected patch will reseed a whole neighbourhood and thus to a great extent spoil the results of a whole season's hard fight against the pest. Co-operation, therefore, is essential upon the part of all the farmers in a district in order to eradicate this weed.

Recent Introductions.

Rocket or Roquette (*Eruca sativa*). This weed which has been mentioned and described in our last two annual reports, continues to be reported from various parts of the Province as occurring in alfalfa fields. Its appearance in many cases has caused considerable alarm as it is a strong grower and a free seeder. Mr. G. H. Clark, in the last edition of "Farm Weeds of Canada," states that it is seldom considered a noxious weed in Europe, where it is frequently grown as a pot herb. This assurance, however, should not cause farmers in Ontario to be neglectful of it as many weeds which are not considered noxious in Europe are serious pests in Canada. A close watch, therefore, should be kept for it and all specimens which make their appearance should be pulled before they go to seed.

Barnaby's Thistle (*Centaurea solstitialis, L.*). This plant was reported last year as a weed in alfalfa fields, and during the past season has been sent in from several different parts of Ontario. A full description is given of it in our last annual report. It is easily recognized by the long, conspicuous yellow spines which surround the flower head. It is a conspicuous annual plant, and therefore not likely to become a serious pest.

Bur Grass, Sandbur or Hedgehog Grass (*Cenchrus tribuloides, L.*). This grass has been reported several times during the past season as growing as a weed in Ontario. Correspondents claim that on account of its spiny nature it is a very disagreeable and difficult weed to deal with. It is a low spreading annual grass found chiefly in sandy places. It is easily recognized by the peculiar spike composed of from 8 to 20 spherical prickly heads or burs which detach easily and adhere to clothing.

Forked Catchfly (*Silene dichotoma,* Ehrh). This plant was reported for the first time this year as a weed in cultivated fields in Ontario. It resembles Night-flowering Catchfly somewhat, but the plant is not so large and robust; the inflorescence is forked and the flowers much smaller. This plant, being an annual, is not likely to become a bad weed.

Gumweed or Gum Plant (*Grindelia squarrosa,* (Purch) Dumah). This plant was sent in for identification several times this past summer from different

parts of Ontario. It is a coarse biennial weed with golden yellow flowers. The buds and flower heads are covered with gummy resinous secretion from which the plant gets the common name, Gum Plant. It is a common weed in the West but seldom troublesome in cultivated fields. It is supposed to cause hay fever.

German Knotgrass (*Scleranthus annuus,* L.). This is a plant to which the writer's attention was called while attending weed meetings this past summer in Simcoe and Waterloo Counties. Those who have had experience with it claim that it is very hard to eradicate. It is a low spreading annual plant with a stiff forking stem and narrow pointed leaves, often appearing to be in whorls. The flowers are borne in clusters in the axils of the leaves. They are inconspicuous, being without petals, small and greenish. A properly cared for hoed crop should rid a badly infested field of this pest.

Buffalo Bur (*Solanum rostratum,* Dunal). This is another weed which we believe to be practically new to Ontario. It was sent in by a correspondent for the first time this year. In the Southwestern States it is considered a very serious pest. It is a coarse growing, somewhat woody, hardy annual plant, with the branches and main stem covered with sharp yellow prickles. The leaves are cut and lobed; flower bright yellow, and about an inch across. The fruit is a berry which is enclosed by a close fitting and prickly calyx which has suggested the common name, Buffalo Bur.

Weed Seed Collections.

In order to aid farmers, seedsmen, and others to become acquainted with the common impurities of clover, grass, and other economic seeds, the Botanical Department has prepared seed cases containing the weeds covered by the Seed Control Act of 1905, together with ten other more common impurities of clover and grass seed, which farmers and seedsmen should know. On the back of these cases is printed a brief summary of the Seed Control Act of 1905, some general advice on buying clover and grass seed and on the control of weeds. These seed cases are furnished to all who desire them at cost price (25 cents), on application to the Botanical Department, Ontario Agricultural College. A considerable number of these cases have been sent out during the past year and a steady demand continues for them.

Plant Diseases.

No serious outbreaks of fungus diseases have occurred in the Province during the past year. Numerous enquiries, however, have been received concerning diseases of a more or less serious nature. Some of these were due to parasitic fungi, others to obscure physiological causes. Among the latter class may be mentioned a peculiar browning and shrivelling of the leaves of hard maples, noticed in some parts of Ontario. Leaves showing this peculiar disorder were sent to the department several times with enquiries as to cause and treatment. They were carefully examined but showed no trace of parasitic fungi. Amongst the diseases due to parasitic fungi upon which advice was given, the following may be mentioned: Peach Leaf Curl (*Exoascus deformans*); Late Blight of Potato (*Phytophthora infestans*); Mildew of Grass and Cereals (*Erysiphe graminis*); Leaf Spot of Beet (*Cercospora beticola*); Peach Mildew (*Sphaerotheca pannosa*); Strawberry Leaf Spot (*Mycosphaerella fragariae*) and Leaf Spot of Cabbage (*Macrosporium brassicae*). A number of fleshy fungi were also sent in for identification with enquiries as to whether they were edible or not.

Mr. Alfred Eastham spent the summer months investigating the Black Rot Canker in Ontario, and contributes the following synopsis of his investigations on this very important disease:

Black Rot Canker (*Sphaeropsis malorum,* Peck.).

Attention was first called to the importance of this disease by Paddock in Bulletins 163 and 181 of the New York Geneva Station. The cause of the majority of apple tree cankers in that state was proved by this worker to be due to *Sphaeropsis malorum,* Peck., a fungus which was previously known to cause a somewhat unimportant disease of the fruit known as Black Rot. The Black Rot Canker was found by Paddock to be prevalent in New York State, in fact the disease frequently goes by the name of the New York Apple-tree Canker. But this disease is by no means confined to New York. In the United States it occurs from Alabama to the northern boundary and from New Hampshire and New York westward to Nebraska and Illinois. In Canada it is widespread both in Ontario and Quebec, being apparently, however, most severe in the colder and more exposed sections. Thus in Ontario we find it worst in the counties of Prince Edward, Ontario and Hastings, in fact east of Toronto generally. In the less exposed sections of the province, as for instance the Niagara district, the disease is of little consequence, though an infected tree may occasionally be found.

Although the fungus is known to attack pear, quince and certain other allied Rosaceous trees, yet, as far as the writer has observed, it is in Ontario confined entirely to the apple. There is, however, in certain sections of Ontario a common and destructive canker on the white poplar which is believed by many to be caused by the Black Rot fungus. This is, however, extremely improbable, as with the exception of a slight superficial resemblance the cankers are quite distinct in appearance. Although there are apparently no varieties of apples which are immune from this disease, yet certain ones are far more susceptible than others, and furthermore, the susceptibility of any particular variety seems to vary somewhat with the district. Generally speaking, however, the varieties which suffer most severely are the Ben Davis, Northern Spy, Stark, Ontario, Walbridge, Salome, Shannon, and King. Of the more resistant varieties we may mention Peewaukee, Cranberry, Pippin, McMahon White and Tolman Sweet.

The fungus may occur on any part of the tree, being found attacking the trunk, branches, leaves, fruit, and occasionally the twigs.

On the leaves it appears as a small purplish spot which ultimately attains a size of from 1-8 inch to 1-4 inch in diameter. The centre of the spot gradually becomes brownish or yellowish owing to the death of the leaf tissue, and we get finally a brownish spot surrounded by a purplish ring which is quite characteristic, and usually serves to distinguish this disease from the "spots" due to the attacks of other fungi.

On the fruit Black Rot has long been known. As a rule, however, the damage done is slight and practically negligible. The fungus apparently gains entrance by means of some injury and afterwards sets up a black rot which ultimately becomes dark in color and covered with small, black, pimple-like bodies or pycnidia which are filled with numerous spores. These spores are disseminated by the wind, and hence it is important to destroy all diseased fruit since it serves as a constant source of infection for the trunk and branches. It is on these latter portions that the disease is most severe, the fungus causing serious cankers, a phase of the disease which has caused much alarm in certain sections of Ontario. There

is little doubt that the great majority of cankers found on apple trees throughout Ontario are caused by the Black Rot fungus. Careful examination of cankers from many part of the Province, together with inoculation work made both from diseased fruit and cankers, have shown conclusively that these cankers are undoubtedly due to this particular fungus.

The mature spores were found being disseminated from the cankers as early as the first week in April. At the same time large numbers of spores were found on rotten apples in the same orchards. The fungus gains entrance through some wound or injury, and by its growth gives rise to characteristic diseased areas, on which appears the small black pcynidia. From the writer's experiments and observations it would appear that these cankers do not usually produce spores the first season of growth; this, however, does not appear to be a constant feature. The cankers grow with considerable rapidity and the trunk or branch becomes girdled, death resulting to the entire tree or to the branch involved, as the case may be. Most of the cankers appear to be of comparatively recent growth, and furthermore, they are usually more severe on young trees. By many fruitgrowers the great freeze in 1903-4 is held repsonsible for much of the disease and there can be little doubt that many of the cankers, particularly in Prince Edward county, date back to that year.

As regards the control of this disease, there are several points of importance:

(1) Keeping the trees in a good healthy condition by means of good cultivation, etc. Orchards in sod are often very badly infected.

(2) Prevention of injury, particularly winter injury, *e.g.,* sunscald, which is responsible for a large percentage of the cankers on young trees. High-headed trees often suffer severely from sunscald and consequently canker.

(3) Carefully cutting out the cankers, disinfecting with corrosive sublimate, and painting with raw oil paint.

(4) Lastly, thorough spraying, paying particular attention to the trunks and branches, using lime-sulphur before the buds swell, and Bordeaux later on.

There can be little doubt that with good cultivation, thorough spraying and careful cutting out of all cankers, and thorough destruction of all diseased rubbish this disease can be controlled, a fact which has been demonstrated during the past year by numerous fruit growers east of Toronto.

Experimental Work.

The time devoted to experimental work during the past year has been very limited owing to the increased academic duties due to very much larger regular classes and special spring and summer classes in Nature Study and Elementary Agriculture. Some experiments, however, have been carried on in spraying to kill weeds, destroying Bindweed and testing Clover and Alfalfa seed. The results of these experiments are herewith given.

Spraying Experiments.

In our last annual report the results of the experiments in spraying Mustard and other weeds with iron sulphate were given. These results, so far as time permitted, have been further substantiated by more experiments along the same line and on a rather more extensive scale. A test was also made to compare the efficiency of iron sulphate (or copperas) with that of copper sulphate (or blue-stone) as a herbicide to destroy Wild Mustard. Without entering into the details of the methods and results of these experiments, which are very similar to those outlined

in last year's report, which is available to those who are particularly interested, the conclusions drawn from the results of these two years' work are here given:

1. That iron sulphate, $FeSO_4$ (copperas), can be successfully used to destroy Mustard in standing cereal crops without injuring them.

2. That the best results are obtained by using a solution containing about 100 lbs. of iron sulphate to 50 gallons of water.

3. That to be most effective the solution should be applied just before the plants come into bloom.

4. That the spraying should be done on a bright, sunny day during a spell of fine weather. A heavy rain within 24 hours after spraying lessens very materially the herbicidal activity of the solution.

5. Solutions of iron sulphate are more effective in destroying Mustard than those of copper sulphate and are more easily prepared.

6. An ordinary hand pump may be used for this spraying or a potato power sprayer with the nozzles set closer together. A fine, steady spray is most effective.

7. A little whitening put in the solution makes it possible to see more readily how much of the field has been sprayed, and thus avoid missing strips here and there.

8. Field Bindweed, Sow Thistle, Canada Thistle, and the Plantains cannot be destroyed by spraying with iron sulphate as the perennial underground parts are not reached by the solution.

Bindweed Experiments.

An attempt was made to kill Bindweed by applying crystals of iron sulphate. On a thick patch of Bindweed, 3 yards long by 2 yards wide, 20 lbs. of the crystals of iron sulphate were placed. On a similar patch of the same size, 9 lbs. were applied. On inspecting the plots three days after the applications were made, it was found that on the plot on which only 9 lbs. of the iron sulphate had been applied the leaves were only slightly damaged, while on the plot on which 20 lbs. had been used all the leaves and stems were blackened and destroyed. Three weeks later, however, both plots looked as green and fresh as ever; even the heavy application having failed to weaken the underground root-stocks.

Tar Paper Experiment.

A trial was made to smother out Bindweed by covering with tar paper. On June 1st a patch five yards long by three yards wide was covered with tar paper, and the ends and sides banked with earth and stones. The experiment was not a success, as the weed spread out around the ends and sides in spite of the heavy covering of earth and stones, and the tar paper wrinkled and tore in spots, allowing the weed to send out shoots to the sunlight. In the fall, though the patch was bleached and weakened, it was by no means destroyed. It is probable that two layers of the paper would be more effective, especially if the patch was closely watched and any shoots appearing around the edges destroyed.

Correspondents report that they have been able to smother out small patches of Bindweed by covering it with the fine grass raked off the lawn after mowing. The covering requires to be very heavy and well packed down and a little earth thrown on top. Straggling shoots, which will make their way up even through such a covering, must be pulled out if the treatment is to be thoroughly successful.

Alfalfa and Clover Seed Investigations.

During the past two seasons a large number of samples of clover and alfalfa seeds were examined as to freedom from weed seeds, dirt, etc., with the following objects in view:

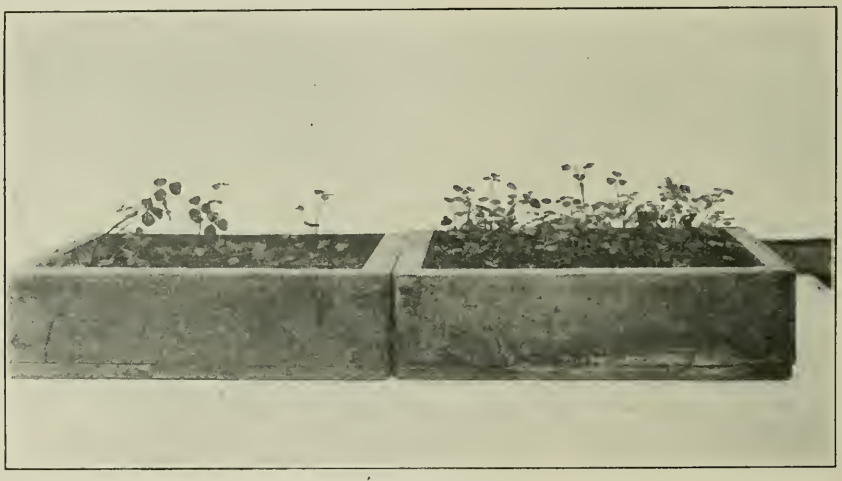
1. To determine as far as possible the condition of clover seed as sown in Ontario as regards the number and kind of weed seeds contained.

2. To ascertain the weed seeds that are most commonly found in the various kinds of clover seed.

3. To note the new weeds that are likely to be spread through the Province as impurities in clover seed.

4. To get some idea as to whether the germination capacity of a sample of clover seed can, to any extent, be determined by plumpness and brightness of the seeds in a sample.

5. To determine the loss caused by buying clover seed containing a large per-



Alfalfa plants grown from plump, bright seed (on the right) and from shrunken seed (on the left).

centage of dirt and inert matter, such as is too often found in clover seed offered for sale.

This work is still under way and the following is but a report of progress.

Tests with Alfalfa Seed.

The experiment with alfalfa seed was conducted as follows: Ten samples of alfalfa seed, sent in by correspondents for test, were taken at random, and a hundred plump bright seeds, a hundred discolored plump seeds and a hundred shrunken seeds counted out from each sample and placed in Zurich germinators. These were kept in the greenhouse at a suitable temperature, and the seeds of each class of each sample removed and counted as they germinated. This experiment was duplicated by sowing a hundred seeds of each class from ten other samples in shallow pots. This was done as germination tests give but a relative idea of the number of plants that will grow, as some seeds contain enough vitality to germinate, but not enough

to produce a plant. At the same time no accurate idea of the vigor of the plants that will be produced can be obtained from a germination test.

The following tables give the results of these two experiments:

GERMINATION TESTS WITH ALFALFA SEED.

No. of sample.	No. of bright, plump seeds that germinated.	No. of dull, plump seeds that germinated.	No. of shrunken seeds that germinated.
1	91	89	48
2	74	60	36
3	99	70	36
4	87	61	3
5	98	59	19
6	90	69	46
7	98	55	10
8	91	48	14
9	92	29	35
10	5	13	43
Totals.....	825	553	290

SOWING TEST WITH ALFALFA SEED.

No of samples.	No. of plants produced by bright plump seeds.	No. of plants produced by dull plump seeds.	No. of plants produced by shrunken seeds.
1	69	36	22
2	40	25	28
3	74	66	11
4	66	34	38
5	61	41	32
6	50	23	15
7	97	53	20
8	82	39	34
9	77	26	30
10	96	26	33
Totals.....	712	369	263

It will be seen at a glance at the table that out of the thousand plump bright seeds sown 825 germinated, making the average germination capacity of the bright plump seeds 82.5 per cent.; while out of the thousand discolored plump seeds only 553, or 55.3 per cent. germinated, a difference in favor of the bright plump seeds of 27.2 per cent. The difference is still more marked in the case of the shrunken seeds; only 290 out of the thousand, or 29 per cent,, germinated, making a difference in favor of the bright plump seeds of 53.5 per cent.

The table showing the results of planting the seeds and growing the plants shows still more marked results in favor of bright plump seeds. The thousand plump bright seeds sown produced 712 healthy, vigorous young plants; the thousand discolored plump seeds produced 369 plants, and the thousand shrunken seeds produced only 263 plants. Thus the bright plump samples produced on an average 34.3 per cent. more plants than the dull plump seeds, and 44.9 per cent. more plants than the shrunken seeds. It should also be added that there was a very noticeable

difference in the vigor of the plants produced from the different samples. The plants from the bright plump seeds were in every case the healthiest and most vigorous.

These results have a practical bearing indicating very clearly the importance of looking over samples of alfalfa seed carefully before buying in order to secure a sample containing as small a percentage as possible of shrunken and discolored seeds. A careful observer will be very much impressed by the great variation in this respect of different lots of seeds, some containing a large quantity of shrunken and discolored seeds, others a very small percentage.

Red Clover Germination Test.

A similar experiment was conducted with Red Clover seed, but only bright plump seeds and dull plump seeds were tested. Out of two thousand bright plump seeds, one hundred from each of twenty samples, 1818 germinated, indicating an average germination capacity for the bright plump samples of 90.9 per cent. Out of the two thousand dull plump seeds selected, 1,702 germinated, indicating an average germinative capacity for the dull plump samples of 85.1 per cent. The average germinative capacity of the twenty bright plump samples was thus 5.8 higher than the average germinative capacity of the twenty dull plump samples. These results, though not so marked as with the alfalfa seed, again indicate the importance of selecting bright, well colored seed.

Purity of Alfalfa Seed.

Out of 147 samples of alfalfa seed submitted for test by farmers and seedsmen 15 were found to be absolutely free from weed seeds of any kind, 98 to be free from the weeds covered by the Seed Control Act, though containing other weed seeds in various amounts; 34 were found to contain sufficient weed seeds to disqualify them from being offered for sale in Ontario. Out of the 147 samples tested 7 were noticeably dark and discolored, indicating lack of germinative capacity; and 4 were found to contain very large quantities of grit and other inert matter.

The following weed seeds were found to be the most common impurities in alfalfa seed: Green Foxtail (*Setaria viridis*), present in 56 samples; Lamb's Quarters (*Chenopodium album*), present in 42 samples; Russian Thistle (*Salsola Kali*, var. *tenuifolia*), present in 35 samples; Buckhorn or Ribgrass (*Plantago lanceolata*), present in 32 samples; Curled Dock (*Rumex crispus*), present in 21 samples; Pigweed (*Amaranthus retroflexus*), present in 20 samples; Ragweed (*Ambrosia artemisaefolia*), present in 11 samples; Yellow Foxtail (*Setaria glauca*), present in 10 samples; Chicory (*Cichorium Intylbus*), Wild Carrot (*Daucus carota*), Bull Thistle (*Cirsium lanceolatum*) and (*Centaurea picris*) present in 9 samples.

Other weed seeds found in alfalfa were Black Medick (*Medicago lupulina*), Sweet Clover (*Melilotus alba*), Lady's Thumb (*Polygonum Persecaria*), Knot Grass (*Polygonum aviculare*), Sheep Sorrel (*Rumex Acetosella*), Dodder (*Cuscuta sp.*), Old Witch Grass (*Panicum capillare*), Mayweed (*Anthemis cotula*), Yellow Cress (*Radicula palustris*), Field Mustard (*Brassica arvensis*), Night-flowering Catchfly (*Silene noctiflora*); Scotch Thistle (*Onopordum acanthium*), Corn Flower (*Centaurea nigra*), Black Bindweed (*Polygonum Convolvulus*), Mint

(*Mentha* sp.), Water Hemlock (*Cicuta maculata*), Musk Thistle (*Carduus nutans*), Stick Seed (*Lappula echinata*), White Cockle (*Lycnhis alba*), Bedstraw (*Galium Aperine*), Canada Thistle (*Cirsium arvense*), Barnyard Grass (*Echinochloa crus-galli*), Cow Cress (*Lepidium campestre*), Corn Gromwell (*Lithospernum arvense*), Mallow (*Malva rotundifolia*).

Purity of Alsike Seed.

Out of 45 samples of alsike seed tested none were found to be absolutely free from weed seeds, 4 only were free from the weed seeds covered by the Seed Control Act, 41 contained weed seeds covered by the Act.

The following were found to be the most common impurities in alsike seed: Night-flowering Catchfly present in 37 samples, Curled Dock present in 17 samples, Sheep Sorrel present in 16 samples, Lamb's Quarters present in 11 samples, Green Foxtail present in 7 samples.

Other weed seeds found in alsike were: Bladder Campion, Bugle Weed (*Lycopus virginicus*), Rib-grass or Buckhorn, Rough Cinquefoil (*Potentilla monspeliensis*), Wormseed Mustard, False Flax, Chickweed (*Stellaria media*), Canada Thistle, Black Bindweed, Lady's Thumb, Black Medick, Common Plantain, Old Witch Grass, Pigweed, Ragweed, Yellow Cress, Yellow Foxtail, Evening Primrose, Pepper Grass (*Lepidium* sp.), Mayweed, Mouse-ear Chickweed (*Cerastium vulgatum*), Shepherd's Purse (*Capsella Bursa-pastoris*).

Purity of Red Clover Seed.

Out of 78 samples tested 1 was absolutely free from weed seeds; 21 were free from the weed seeds covered by the Seed Control Act; 56 contained weed seeds covered by the Seed Control Act; 5 samples contained large amounts of grit and other inert matter.

The following were found to be the most common impurities in red clover seed: Green Foxtail present in 50 samples, Buckhorn or Ribgrass present in 35 samples, Curled Dock present in 26 samples, Lady's Thumb present in 21, Ragweed in 20, Lamb's Quarters present in 17 samples, Pale Plantain (*Plantago Rugelii*), Night-flowering Catchfly, and Sheep Sorrel present in 12 samples.

Other weed seeds found in red clover were Mayweed, Wild Oats (*Avena fatua*), Black Medick, Canada Thistle, Yellow Foxtail, Common Plantain (*Plantago major*), Bladder Campion (*Silene latifolia*), Heal-all (*Prunella vulgaris*), Pigweed, False Flax (*Camelina sativa*), Bracted Plantain (*Plantago aristata*), Catnip (*Nepeta cataria*), Wormseed Mustard (*Erysimum cheiranthoides*), Stickseed, Evening Primrose (*Onagra biennis*), Old Witch Grass, Barnyard Grass, Cow Cress, Knot Grass, Black Bindweed, Wild Carrot, Wild Vetch (*Vicia cracca*), Dodder.

Purity of Timothy Seed.

Out of 33 samples tested 3 were entirely free from weed seeds, 17 contained no weed seeds covered by the Seed Control Act, 13 contained weed seeds covered by the Act.

The following were the commonest impurities found in timothy seed: Pale Plantain present in 16 samples, Lamb's Quarters present in 11 samples, Evening

Primrose present in 8 samples, Ribgrass or Buckhorn present in 7 samples, Pepper Grass and Cone Flower (*Rudbeckia hirta*) present in 6 samples.

Other weed seeds found in timothy were: Mint, Ergot (*Claviceps purpurea*), Blue Vervain (*Verbena hastata*), Night-flowering Catchfly, Spiny Annual Sow Thistle, Old Witch Grass, Finger Grass (*Digitaria sanquinale*), Wormseed Mustard, Common Plantain, Rough Cinquefoil, Green Foxtail, Bugle Weed, Curled Dock, Mayweed, False Flax, Lady's Thumb, Sheep Sorrel, Catnip and Mouse-ear Chickweed.

Outside Lectures.

The following is a list of the outside lectures and addresses delivered by the members of the Botanical staff during the past year:

"How Plants Grow," by Mr. J. W. Eastham, before the Horticultural Short Course Class in February; "The Perennial Sow Thistle and Other Noxious Weeds," by J. E. Howitt at Whitby on May 21st; "Noxious Weeds," by J. E. Howitt at the Annual Meeting of the West York Farmers' Institute at Weston, June 9th; "Weeds," by J. W. Eastham at Ayr on June 30th. Other meetings in the interest of pure seed and fewer weeds were addressed by Mr. Howitt at Branchton, New Hamburg and Crown Hill.

Publications.

Mr. Howitt has acted as Botanical Editor of the Ontario Natural Science Bulletin, and has contributed a number of short articles on "Weeds and Weed Seeds" to *Farm and Dairy, The Farmer's Advocate, The Canadian Horticulturist,* and the Annual Report of Farmers' Institutes in Ontario.

Mr. Eastham has contributed a number of articles on the control of fungus diseases to various publications.

Herbarium.

A large number of new specimens have been added, including a most interesting collection of Rocky Mountain plants contributed by Mr. N. H. Cowdry, Waterford, Ont., and a fairly representative collection of our common cultivated plants prepared by the members of the Botanical staff, the latter to serve as a reference collection for advanced students in Biology and Horticulture in naming the specimens in their own collections. A large number of permanent slides of the economic parasitic fungi have also been put up and added to the reference collections of parasitic fungi.

Respectfully submitted,

S. B. McCREADY.

PART V.

THE PROFESSOR OF PHYSICS.

To the President of the Ontario Agricultural College.

SIR,—I have the honour to submit herewith my fourth report as head of the department of Physics.

INSTRUCTION.

(*a*) *Lecture Courses.* In the first year the instruction in the department consists of courses in Arithmetic, Hydrostatics as a preparation for and followed by Soil Physics, and, lastly, a course in the principles of Mechanics. The work of the second year consists of Surveying, Drainage, and Farm Power and Farm Water Supply by electricity, wind and water. The third year make a specialty of Meteorology, Cold Storage, and Ventilation, based upon a thorough course in Heat. In the final year, Climatology, advanced Drainage, and advanced Soil Physics are emphasized.

(*b*) *Laboratory Work.* Laboratory practice is given all the years, in the various subjects.

WEATHER REPORT.

Tables I. and II. give a summary of the weather data at representative stations which this department has equipped with the necessary meteorological instruments

TABLE I.—WEATHER REPORT OF 1909.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	*Precipitation in inches.	†Departure from normal.
O. A. C. Guelph—		[22 yrs.]						[22 yrs.]
January	23.2	+3.1	58.0	—12 0	4.25	1.77	2.20	+ .69
February	23.5	+4.4	48.0	— 7.0	2.00	1.07	1.27	— .32
March	26.6	— .3	41.0	7.0	7.75	.41	1.19	— .17
April	39.3	—1.9	66.0	12.0	3.00	3.30	3.60	+1.97
May	50.6	— .6	80 0	29.0	1.06	3.32	3.43	+1.06
June	64 9	+1.6	93.0	38.0	.....	1.33	1.33	—1.55
July	68.2	+ 1	86.5	44.0	.....	4.54	4.54	+1.50
August	67.7	+1.4	93.0	41.0	.....	.89	.89	—1.26
September	57.9	—2.0	94.0	31.0	.....	.86	.86	—1.34
October	43.1	—3.1	75.0	23.0	.....	.99	.99	—1.28
November	39.0	+4.7	65.0	11.0	.....	6.42	6.42	+4.13
December	21.5	—2.2	43 0	— 9.0	2.80	.08	.36	—1 28
Year	43.8	+ .4	94.0	—12.0	20.86	24.98	27.07	+1.43

TABLE I.—Weather Report of 1909.—Continued.

Month.	Mean temperature.	†Departure from Normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	*Precipitation in inches.	†Departure from Normal.
Bay View, P. E. I.—		[3 yrs.]						[3 yrs.]
January	17.3	— .3	54.0	—11.0	20.8	1.14	3.22	+ .59
February	18.2	+2.0	49.0	—23.8	4.7	1.02	1.49	— .29
March	28.3	+3.3	46.0	— 5.0	32.0	.81	4.01	+1.56
April	33.1	+1.5	63.0	11.0	7.0	3.05	3.75	+ 37
May	44.9	+1.4	71.0	27.0	.....	2.92	2.92	+ .25
June	58.1	+1.8	81.0	41.0	.....	1.10	1.10	— .38
July	63.8	+ .8	83.5	43.0	.....	3.10	3.10	— .85
August	65.7	+3.0	86.5	49.0	.....	5.24	5.24	— .03
September	.....	.....	.....	.....	.....	.....	.....	.....
October	47.4	+0 0	65.0	28.0	.....	4.14	4.14	+ .31
November	41.2	+3.8	68.0	20.0	.04	1.59	1.60	—1.36
December	24.7	— .2	46.0	2.0	5.00	2.63	3.13	—1.29
Year	.....	.....	86.5	23.08	69.54	.....	.....	.....
Jordan Harbour. (Lincoln Co.)—		[2 yrs.]						[2 yrs.]
January	28 0	.....	62.0	2.0	19.5	.63	2.58	.....
February	26.9	.....	53.0	5.5	7 88	1.01	1.80	.....
March	30.2	—2.8	45 0	10.0	9.00	1.52	2 42	+ .81
April	41.1	— .4	70.0	17 0	.55	1.83	1.89	+ .24
May	52.1	— .3	73.0	31.0	.....	2.49	2.49	+ .02
June	64.2	— .9	90.0	42.0	.....	3.41	3.41	+ .50
July	69.2	— 8	90 0	50.0	.....	1.94	1.94	—1.22
August	68.4	+ .2	94 0	44.0	.....	2.72	2.72	+ .65
September	59.1	—1.7	92.0	41.0	.....	2.70	2.70	+1 04
October	45.2	—1.6	79.0	25.0	.....	3.77	3.77	+ .45
November	41.4	+ .9	69.0	24.0	.....	2.64	2.64	+ .63
December	26.1	—1.9	45.0	4.0	.....	1.60	1.60	+ .08
Year	46.0	.....	94.0	2.0	36.93	26.26	29.96	.....
Leamington, (Essex Co.)—		[3 yrs.]						[3 yrs.]
January	29.5	+2.4	57.0	— 3.0	3.00	.57	.87	—2.09
February	30.2	+6.4	47 0	18.0	.....	.....	.....	.....
March	31 2	—3.3	49.0	15.0	.....	.....	.....	.....
April	41.1	— .3	64.0	29.0	.....	.....	.....	.....
May	47.7	—3.7	70.0	28.0	.....	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....	.....
July	71.4	— .5	90.0	51.0	.....	.....	.....	.....
August	70.8	+1.5	89.0	47.0	.....	2.64	2.64	— .49
September	56.5	—5.0	95.0	37.0	.....	1.91	1.91	— .41
October	46.7	—2.2	79.0	23.0	.....	1.48	1.48	— .36
November	42.6	+2.6	64.0	19.0	.....	4.60	4.60	+2.00
December	29.1	— .2	51.0	.4	10.5	.88	1.93	+ .38
Year	.....	.....	95.0	— 3.0	13.5	.....	.....	.....

TABLE I.—Weather Report of 1909.—Continued.

Month.	Mean temperature.	†Departure from Normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	*Precipitation in inches.	†Departure from Normal.
Magnetawan. (Parry Sound)—		4 yrs.]						[4 yrs.]
January	14.6	+0.0	43.5	—24.0	8.2	1.90	2.72	— .53
February	12.7	+2.6	44.5	—19.5	25.7	1.97	4.54	+1.40
March	20.2	+ .4	40.0	—11.5	22.5	.62	2.87	+ .12
April	34.3	— .3	58.0	3.5	20.2	2.40	4.42	+1.11
May	48.0	+ .8	75.0	26.5	1.2	3.91	4.03	+2.69
June	60.0	— .6	82.0	32.5	.....	.65	.65	—1.90
July	63.3	— .8	84.5	37.0	.....	2.93	2.93	+1.40
August	64 0	+1.4	88.5	28.5	.....	2.15	2.15	—1.65
September	54.4	—2.5	86.0	29.0	.....	3.70	3.70	+ .53
October	41.1	—1.2	76.0	13 5	2.6	2 95	3.21	+ .02
November	36.2	+4.4	67.0	— 3.0	8.0	2.92	3.72	+ .20
December	18.2	+1.7	41.5	—14.0	20.2	.67	2.69	— .37
Year	38.9	— .6	88.5	—24.0	108 6	26.77	37.63	+ .56
Maitland. (Grenville Co.)—		[4 yrs.]						[4 yrs.]
January	18 5	+ .5	44.0	—15.0	8,0	4.20	5.00	— .49
February	19.2	+7.0	45.0	— 4 0	8.5	1.30	2.15	+ .51
March	24.4	+5.6	42.0	0.0	17.5	.70	2 45	+ .52
April	38.6	+ .9	66.0	16.0	1.0	2 12	2.22	+ 01
May	52 8	+1.5	74.0	32.0	....	4.19	4.19	+ .83
June	63.2	—1.0	85.0	41.0	.....	1.82	1.82	—1.21
July	66.5	—1.2	87.0	47.0	.....	3.84	3.84	+1.27
August	67.4	+ .1	91.0	43.0	.....	2.43	2.43	+ .96
September	59.2	—2.5	83.0	40.0	.....	3.35	3.35	+ .51
October	46.4	—1.0	79.0	40.0	.....	1.53	1.53	— .66
November	33.7	—1.0	66.0	21.0	2.0	1.40	1.60	— .28
December	16.8	—1.3	39 0	12.0	1.5	2.19	2.34	+ .07
Year	42.2	—1.6	91.0	—15.0	38.50	29.07	32.92	+5.37
Marksville. (St. Joseph Island)—		[4 yrs.]						[4 yrs.]
January	20.3	+ .5	40.0	0.0	13.0	.....	1.30	—1.87
February	19.9	+3.1	39.0	1.0	24.0	1.0	3.40	+1.00
March	22.6	— .5	42.0	1.0	32.0	....	3.20	+ .41
April	34.5	— .6	52.0	7.0	13.0	2.5	3.80	+1.62
May	48.8	+1.4	83.0	20,0	2.0	2.81	3.01	— .47
June	62.1	+1.1	88.0	36.0	.....	.97	.97	—2.00
July	64.8	— .1	85.0	47.0	.....	3.25	3.25	— .08
August	64.8	+1.8	87.0	35.0	.....	4 71	4.71	+ .93
September	53.1	—6.2	73 0	30.0	.....	3.67	3.67	— .11
October	43.0	—1.1	68.0	17.0	.....	3.07	3.07	+ .01
November	37 2	+2.3	61.0	8.0	4.0	1.21	1.61	—1.09
December	23.3	+2.5	44.0	0.0	22.0	.50	2.70	+ .49
Year	41.2	+ .4	88.0	0.0	110.0	23.69	34.69	+ .87

TABLE I.—WEATHER REPORT OF 1909.—Concluded.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	*Precipitation in inches.	†Departure from normal.
St. Catharines. (Lincoln Co.)—		[3 yrs.]						[3 yrs.]
January	29.0	+1.8	61.0	—9.0	17.1	.72	2.43	+ .7
February	27.8	+5.9	54.0	—2.0	13.0	1.62	2.92	+ .26
March	28.4	—2.6	45.0	12.0	8.0	1.82	2.62	— .13
April	42.7	+1.7	70.0	17.0	.....	3.31	3.31	+1.06
May	53.2	+3.3	78.0	33.0	.....	5.05	5.05	+1.45
June	65.1	+ .3	88.0	42.0	.....	1.24	1.24	.....
July	69.6	— .4	89.0	50.0	.....	2.98	2.98	.....
August	69.5	+1.8	93.0	44.0	.....	1.88	1.88	+ .05
September	60.6	—2.9	93.0	40.0	.....	3.61	3.61	+1.05
October	46.2	—2.8	78.0	24.0	.....	2.30	2.30	+ .41
November	43.6	+3.1	69.0	23.0	3.00	2.81	3.11	+ .69
December	27.1	—2.3	53.0	4.0	2.05	1.72	1.93	— .63
Year	46.9	+0.0	93.0	—9.0	43.15	29.06	33.38	.....
Sturgeon Lake. (Victoria Co.)—		[2 yrs.						[2 yrs.
January	18.1	+ .2	43.0	0.0	11.0	1.44	2.54	+ .47
February	21.8	+3.5	47.0	2.0	11.0	.53	1.63	— .88
March	27.1	+1.6	41.0	3.0	10.0	.....	1.00	+ .10
April	36.3	— .7	62.0	7.0	.5	5.50	5.55	+1.53
May	50.0	—2.2	77.0	30 0	3.5	2.70	3.05	+ .33
June	65.6	+ .3	89.0	39.0	.....	.50	.50	— .30
July	67.6	— .8	87.0	45.0	.....	3.50	3.50	+ .32
August	66.9	+ .8	89.0	37.0	.....	3.62	3.62	+1.11
September	57.2	—2.9	88.0	37.0	.....	1.78	1.78	+ .22
October	.....	.....	.....	.....	.....	.....	.....	.....
November	.....	.....	.....	.....	.....	.....	.....	.....
December	20.2	— .7	60.0	2.0	12.41	.21	1.45	— .02
Walkerton. (Bruce Co —		[2 yrs.]						[2 yrs.
January	.....	.....	.....	.....	.....	.....	.....	.....
February	.....	.....	.....	.....	.....	.....	.....	.....
March	26.8	.....	42.0	4.0	.....	.....	.....	.....
April	.....	.....	.....	.....	.....	.....	.....	.....
May	.....	.....	.....	.....	.....	.....	.....	.....
June	63.3	—1.2	86.0	37.0	.....	1.88	1.88	— .37
July	66.9	—1.1	86.0	45.0	.....	3.26	3.26	+ .44
August	67.8	+1.6	91.0	41.0	.....	3.10	3.10	+1.27
September	58.4	—2.6	90.0	35.0	.....	2.81	2.81	+ .57
October	44.5	—3.3	77.0	24.0	.....	3.86	3.86	+1.51
November	37.4	—1.4	68.0	3.0	.....	4.42	4.42	+ .78
December	23.2	—1.1	47.5	0.0	.....	.98	.98	+ .34

* Calculated by ten inches of snow being equivalent to one inch of rain.

† Figures in brackets in column, "Departure from Normal," indicate the number of years on which normals are based.

TABLE II.—Length of Season at Various Stations.

Station.	Last killing frost in spring.		First killing frost in autumn.		No. of days between 1909.	Average length of season free from killing frost.
	Date.	Degree.	Date.	Degree.		
Guelph	May 2	30	Oct. 14	29	165	146 (22 yrs.)
Bay View, P.E.I.	May 21	27	Oct. 21	28	153	150 (3 yrs.)
Jordan Harbor	April 30	26	Oct. 20	28	173	162 (2 yrs.)
Leamington			Oct. 19	30		
Magnetawan	May 11	30	Aug. 30	28.5	111	121 (4 yrs.)
Maitland	April 30	27	Oct. 18	30	171	149 (4 yrs.)
Marksville	May 11	29	Sept. 27	30	139	133 (4 yrs.)
St. Catharines	April 30	30	Oct. 20	29	176	167 (3 yrs.)
Sturgeon Lake	May 2	30				
Walkerton	May 2	29	Oct. 21	24	146	148 (2 yrs.)

Wind records have been kept throughout the year and Table III. will give an idea of the velocities.

TABLE III.—Wind Record at Guelph.

	Miles of wind.	No. of days on which records were kept.	Average wind per day.	Average wind per hour.	Windiest day.				Calmest day.			
					Total miles.	Miles per hour.	Miles on windiest hour.	Least windy hour.	Total miles.	Miles per hour.	Windiest hour.	Calmest hr.
January	9,476	30.3	312 7	13.0	659	27.4	35	16	23	1.0	5	0
February	9,532	26.5	359 7	15.0	689	28.7	47	9	93	3.9	7	0
March	9,843	31.0	317.5	13.2	632	26.3	37	12	114	4.7	15	1
April	10,611	30.0	353.7	14.7	793	33.0	52	11	136	5.7	18	0
May	7,164	24.6	291.2	12.1	606	25.3	32	12	107	4.5	9	0
June	6,028	30.0	200.9	8.4	411	17.1	29	8	74	3.1	10	0
July	6,548	31.0	211.3	8.8	405	16.9	26	9	75	3.1	9	0
August	5,283	30.6	172.6	7.2	301	12.5	20	7	51	2.1	6	0
September	4,925	22.4	219.8	9.1	356	14.8	29	3	119	4.9	17	2
October	7,591	31.0	244.9	10.2	510	21.2	32	15	67	2.8	7	0
November	7,817	26 1	284.0	12.1	629	26.2	35	17	60	2 5	8	0
December	10,174	31.0	328.2	13.7	641	26.7	36	23	108	4.5	8	0
The year	94,992	344.5	275.7	11.5	793	33.0	52	11	23	1.0	5	0

Lightning Report.

Reports of damage done by lightning have been collected this year as previously. The results are given in tables IV. to VII.

Table IV.—Buildings Struck in 1909.

How reported	Barns.				Houses.				Others.			
	Burned.	Damaged.	Totals.	Loss.	Burned.	Damaged.	Totals.	Loss.	Burned.	Damagen.	Totals.	Loss.
				$ c.				$ c				$ c.
Personally	7	10	17	17,793 20	....	9	9	237 22	....	2	2	10 00
Newspapers	12	3	15	*15,699 90	1	2	3	*79 08	....	5	5	*25 00

*Loss at same rate as those personally reported.
Total loss on all buildings, $33,844.40.

Table V. Other Information Regarding Barns.

Barns personally reported.

Windmill.		Distance from Railway.	
Mill on or near	*1	¼ mile	2
Mo mill	13	½ "	4
Not specified	3	¾ "	3
		1 "	1
Location.		2 "	1
		3 "	2
On hill	2	4 "	2
On knoll	3	6 "	1
On plain	12	Not specified	1

* Lightning struck this mill.

Table VI. Animals Struck.

Animals.	In field.	By fence.	In or near building.	Location not reported.	Totals 1909.	Totals 1901–1909.
Cattle	2	2	46	8	58	309
Sheep						138
Horses			7	4	11	84
Pigs			3	1	4	26

Table VII. Summary of Trees Struck from 1901-1909.

Year.	Elm.	Pine.	Oak.	Maple.	Apple.	Basswood.	Poplar.	Willow.	Ash.	Hemlock.	Balsam.	Cedar.	Spruce.	Cherry.	Chestnut.	Hickory.	Birch.	Beech.	Butternut.	Fir.	Walnut.	Pear.	Thorn.	Total.
1901-1908	40	25	16	12	8	9	6	5	5	5	4	4	4	2	2	2	2	1	1	1	1	1	1	155
1909	2	..	..	1	..	..	..	1	..	..	1	..	..	1	.	..	..	..	..	..	..	..	..	6
1901-1909	42	25	16	13	8	9	6	6	5	5	5	4	4	3	2	2	2	1	1	1	1	1	1	161

DRAINAGE.

Surveying and Demonstration.

The work in drainage surveying has been continued, but the demands for assistance have increased very largely. During the year we have had four extra men engaged in this work, viz.: W. R. Reek, O. C. White, J. Spry and S. H. Gandier. The total number of applications for assistance was 302, the number of surveys made, 179; the number of acres surveyed, 5157. 43 demonstrations were held in various counties with an average attendance of 18. Of the 302 applications 223 were filed with the department. The other 79 applied to our drainage advisors in the field and the work was done for them at once. Of the 223 original applications we were able to attend to only 100. Thus you will see that we were not able to do quite half of the work required by the applications. Moreover, the applications are about doubling in number from year to year, *e.g.*, in 1906 we had 15; in 1907, 126; in 1908, 166; in 1909, 302. In view of the very rapid increase in demand and the fact that we have not been able to attend to half of our applications during the past year, and in view further of the unprecedented interest being taken in drainage during this autumn, the $1,000 appropriation which we have had during the past two years will be altogether inadequate for our requirements, and I would therefore suggest that the appropriation for drainage survey work should be largely increased.

Benefits of Drainage.

Early in the summer we wrote to a large number of the men for whom surveys had been made during 1906, 1907 and 1908, asking them if they had put in any of the drains, and if so to tell us what results they had obtained in the way of being able to sow their crops earlier, getting better looking crops as they grew, and better yields. Many very valuable reports were received, quotations from many of which are given in Bulletin No. 174 just being issued, entitled, "Farm Underdrainage—Does it Pay?" It was found that the gain in seeding time due to drainage ranges from one to six weeks, but the average was in the neighborhood of three to four weeks. This is a very important consideration, for it often means the difference between a good crop and a failure.

The difference in growing crops was shown by samples selected from the standing grain and sent in to the department. These were mounted and photographed, and cuts of them appear in the bulletin mentioned.

The difference in yield on drained and undrained land was very marked. Table VIII. shows the various reports and by whom they were made. The following quotations taken from the daily papers about the middle of October represent fairly well the prices that have prevailed throughout Ontario during the past fall: Wheat $1, barley 58c., oats 47c., peas 90c., corn 75c., hay in Toronto $16 to $20, in Guelph $14.50, straw in Toronto $8, in Guelph $8. If the reader will compute the value of the increases at these prices, allowing increase of one-half ton of straw per acre in each case, he will find it to range from $11.05 to $36.25 per acre, the average being $21.65, not counting the beans which do not constitute a general farming crop; that is, each acre drained on the farms of these men is producing an average of $21.65 more this year than before drainage.

TABLE VIII. DIFFERENCE IN YIELD ON DRAINED AND UNDRAINED LAND.

Grain.	Difference in Yield.			Persons reporting.
	Drained.	Undrained.	Difference.	
Barley	30–50	0	30–50	J. H. Clare, Chapman.
Barley	.....	.....	20	Jos. Lapp, Cedar Grove
Barley	50	30	20	John McIntaggert, Brechin.
Barley	40	25	15	John A. McMahen, Petrolea.
Oats	35	0	35	Wm. Bell, Washago.
Oats	40–100	0	40–100	J. H. Clare, Chapman.
Oats	50	31	19	John McIntaggert, Brechin.
Oats	80	45	35	Jas. Marshall, Hamilton.
Oats	50	10	40	Peter W. Scott, Belgrave.
Oats	50	35	15	J. E. Tovey, Perth.
Peas	25	15	10	Peter W. Scott, Belgrave.
Wheat, fall	45	25	20	Jas. Clayton, Cedar Springs.
Wheat, fall	0	0	30	R. H. McCurdy, Vienna.
Wheat, fall	45	25	20	Jas. Marshall, Hamilton.
Wheat, spring	25	15	10	John McIntaggert, Brechin.
Straw	.....	.....	about doubled	J. H. Clare, Chapman.
Hay	2–3 tons	0	2–3 tons	J. H. Clare, Chapman.
Corn	80	56	24	T. S. Biggar, Walkerville.
Corn	.....	.....	15–20	W. J. Dolsen, Chatham.
Corn	.....	.....	*33⅓	Jas. Martin, Amherstburg.
Corn	.....	.....	*33⅓	J. B. Rhodes, Chatham.
Corn	.....	.....	*33⅓	W. H. Winter, Chatham.
Beans	38	3	35	Jas. Clayton, Cedar Springs.

* 33⅓ = about 20 bushels per acre.

UNDERDRAINAGE AS AN INVESTMENT.

Drainage as an investment has been touched indirectly in the reports of our correspondents. Some have stated that their drains paid for themselves in one year, some in two years. Even where the drains were put less than two rods apart and the cost ran up to $40 an acre they paid for themselves in two crops. Has the farmer any other place where he can invest his money and have the principal returned to him every year, or every two years? But, says someone who has been rendered poor and kept so by the wetness of the land, "We haven't the principal and how can we invest it?" For such cases the Province has long since made provision in the Tile, Stone, and Timber Drainage Act (R.S.O., 1897, chapter 41, revised in chapter 22, 9 Edward VII., 1909) by which any township is authorized to borrow money from the Province to lend to farmers for underdrainage purposes. When an individual wishes to borrow money in this way he applies to the Township Council, and if they approve of the loan to him they pass the necessary by-law, if one has not already been passed, and issue debentures which the Province buys from the Consolidated Revenue Fund, and lend the money to the applicant, who pays it back on the instalment plan, $7.36 per year for twenty years on every $100 borrowed. Now tile drainage to-day costs about $14 to $40 an acre, depending on depth, distance apart, size and price of tile, kind of digging, etc., say $25 average; hence, if a man borrowed $100 under the Drainage Aid Act, it would drain about four acres, and the annual payment would be only $7.36, or $1.84 an acre, while, as pointed out above, the annual increase in crop reported by men who have put in drains is worth $11 to $36 an acre. Surely

a man is safe in borrowing $1.84 to get back $11 to $36. Surely that is a good investment. Surely even the poorest "can afford to underdrain" with this assistance. The writer knows of at least one man who, with very little capital, bought a large wet farm under heavy mortgage and at once underdrained it with money borrowed under the Tile, Stone and Timber Drainage Act. To-day he is well off, and still a man in his prime.

The Value of Underdrainage to the Province.

Learning that each acre that has been drained produces on the average about $20 more per year than before led us to enquire how much land is being drained annually. The Department of Mines, Toronto, has for many years been keeping a record of the number of tile manufactured in Ontario. From their reports we learn that the number in 1900 was 19,544,000, and that this gradually dropped to 15,000,000 in 1905, but it has risen since then to 24,800,000 in 1908. Reports for 1909, which the tile manufacturers have sent us direct, indicate that this year the output is approximately 29,000,000, or almost twice what it was when we began our drainage campaign in 1905. Is it too much to claim that, in the main, the accumulated increase in tile output since 1905 represents the benefit that the Ontario Agricultural College has been to the farmers of the Province directly and indirectly on this one line of farm drainage? In view of the previous falling off in drainage, we think not. If this ground is well taken, let us see the result. The accumulated increase since 1905 amounts to 27,078,000 feet of tile, which would drain 53,178 acres more than would have been drained had the rate in 1905 continued, and the value of the increased crop on this area at $20 per acre, would be $1,063,560 annually.

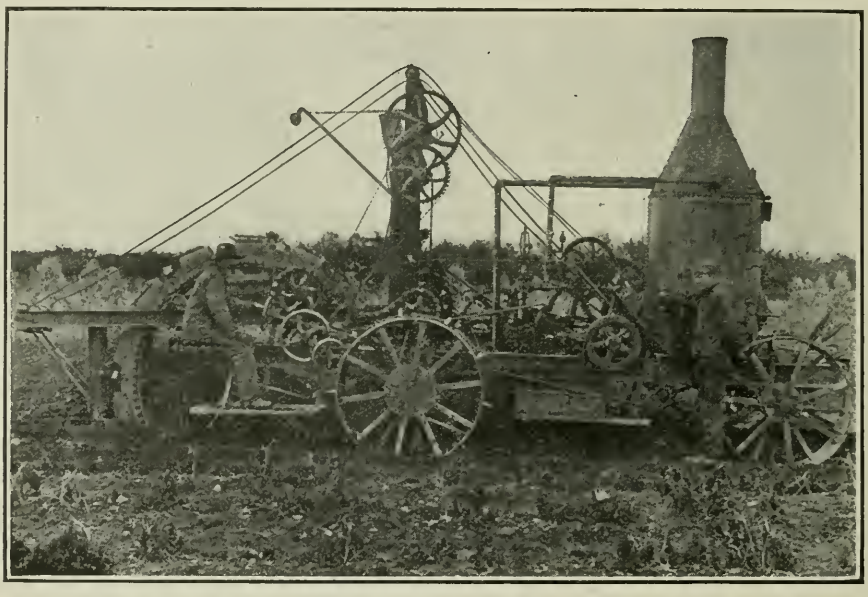
The total number of acres drained during the years 1905-1909 is 193,436, the product of which is worth $3,858,720 more each year than before being drained. All these estimates are based on reports from farmers and tile manufacturers.

To gain a comprehensive view of what underdrainage may mean we must consider the Province as a whole and estimate what proportion of it needs drainage. As a result of careful enquiry and statements of our underdrainage advisors, based on examination of many sections of the Province, I have made the calculation that at least one-third of the cleared land of the Province, or 4,710,000 acres, is in urgent need of underdrainage. If that were all drained and each acre produced $20 more than it does now, the increase in crop would be worth $94,200,000 annually. The value of all field crops in Ontario in 1908, according to the latest report of the Bureau of Industries, was $164,077,000. Thus drainage of all the cleared land needing it will increase Ontario's field crop 57.4 per cent. At the present rate it would take 100 years to complete the drainage.

But that does not tell the whole story of the possibilities of underdrainage. Ontario has 2¼ million acres of slash land and 2¾ millions of swamp, marsh and waste land, or five millions altogether, much of which remains in this comparatively useless state only because it would be too wet for cultivation. On much of the slash and marsh a comparatively small amount of labor would do the necessary clearing and underdrainage would reclaim the land and make it equal to the best. The swamp too, when cleaned, would yield to drainage in the same way. Thus an immense area could be added to the arable land of the Province.

Conditions on Which Drainage Surveys are Made.

The reader's attention has already been drawn to the fact that the department of Physics is in the habit of making drainage surveys for those who apply for such assistance. It may not be out of place before leaving this part of the subject to state the conditions on which these surveys are made. There is no charge for the services of our drainage advisers, their salary being paid from a special drainage appropriation, but their travelling expenses, consisting of railway fare at a cent a mile each way for this work, meals on the way if any, and cartage of instruments if any, must be paid by the parties for whom surveys are made. They must be met at the station and returned to it, accommodated while on the job and furnished with the necessary assistance for the work. As several surveys are usually made on one trip, the actual cash outlay for any one farmer



The steam ditcher, working on the farm of J. A. Lind, Beamsville, Ont.

is not likely to exceed $2. It may be even less; or, in exceptional cases, where farmers live in remote sections, it might amount to $5.

Those wishing surveys made should write to the Department of Physics, O.A.C., Guelph, whereupon regular application forms will be sent.

Construction of Drains.

Besides the investigations as to the value of underdrainage, an exhaustive bulletin, No. 175, on "The Construction of Drains," has been prepared and is now in press. This embodies much of the information that has appeared in the annual reports from time to time. There is also considerable new material on the methods of drainage surveying followed by the department This bulletin on drainage construction is intended to serve as a manual for those actually engaged in putting in drains, and may be had on application to the Department of Agriculture, Toronto.

Traction Ditcher.

In the last annual report of the department reference was made to the Buckeye Traction Ditcher for digging the trenches for the tile, based upon a personal inspection of one of these machines in operation and a visit to the factory. The writer was instrumental in having his brother, Mr. Walter Day, Beamsville, Ontario, purchase one of these machines. It began operations about the 25th of May and has not been short of work since that time. The illustration shows this machine in operation. Some of the land in which it has worked has been very stony and two shafts had to be strengthened to handle these stones. Since that was done there has been practically no lost time with the machine and it has proven entirely satisfactory. From my intimate knowledge of its performance I have no hesitation in saying without reserve that the ditching machine has come to stay. On the stoniest job the machine averaged 50 rods per day, and on the cleanest job 100 rods a day including all stops. On various occasions it has dug in the neighborhood of 130 to 140 rods in a day, making one, two or three sets for this amount.

About the middle of the summer another of these machines was purchased and brought into Essex by Mr. Wilford Finlin. His machine, too, has given good satisfaction. The traction ditcher, when generally introduced, will revolutionize tile drainage operations. It solves the labor problem and makes drainage a comparatively easy proposition.

Changes in the Department.

In February Mr. C. C. Thom, who had for almost three years been Demonstrator in this department, accepted a position at Pullman, Washington State. We were sorry to lose Mr. Thom at a time when permanence in the department was so desirable. Mr. W. R. Reek, then in his third year, assisted with the work of the department for the balance of the term. In May, Mr. R. R. Graham, B.A., was appointed Demonstrator. His work both in laboratory and lectures has proved very acceptable to the students and satisfactory to the department.

Respectfully submitted,

WM. H. DAY.

PART VI.

PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit my report for the year 1909.

INSTRUCTION.

A very large part of my time and of those associated with me in the work of the department has been devoted to carrying out the prescribed courses of lectures and laboratory work. This work is fully outlined in the College Calendar, and has been referred to in previous reports; therefore, it will not be necessary for me to make any detailed statement of it here. I might state, however, that this year we gave two new courses in applied Chemistry, namely, Chemistry of Fruits, Vegetables and Fermentation, and the Chemistry of Insecticides and Fungicides. The first course was given to the Fourth Year Specialists in Horticulture and Bacteriology, and the second to the Specialists in Horticulture and Biology. The demand for the first course of study arose out of the much felt need of the Horticulturists and Bacteriologists having a fuller knowledge of the chemistry of fruits and vegetables in relation to their ripening, storing, canning, etc., and the chemical changes that take place in the fermentation of these products. The second course was given in response to the growing importance of a thorough chemical knowledge of the various substances used in combating insect and fungus pests. We now give courses in Applied Chemistry to all the optional courses of study in the senior year.

For a number of years we have been giving ten half days' laboratory instruction to each person taking the three months' course in Dairying. Most of the members of this class are cheese or butter makers who have practically no knowledge of chemistry, consequently, we cannot go deeply into the chemistry of such a complex substance as milk; but by very simple methods we have them separate and examine the various constituents of milk, learn methods of detecting some of the more common preservatives sometimes used in milk and cream, prove the chemical changes that take place in the curd as it ripens into good, wholesome cheese, etc. We also give the class twelve lectures on the chemistry of milk and its products. These lectures were prepared with the object of explaining many of the operations of the dairy and of encouraging intelligent, thoughtful work, and thus making the work more interesting.

Lectures were also given to the students of the short courses in Live Stock, Poultry, and Horticulture. We also took a share in the instruction of the Normal School students who took the three months' course in Agriculture, and the school teachers taking the four weeks' course in July.

Each year we have to give considerable time to the directing of men who are doing thesis work in this department. Chemistry explains so many agricultural problems that it is to be expected that a large percentage of the men will select subjects involving work in the chemical laboratories. The results obtained in these studies are frequently valuable, but the part of most value to the student

is the training he receives in searching the library for information on his subject, in learning how to attack his subject, and in gaining some idea of what research really means.

Another phase of instruction work which is continually assuming greater proportions is the giving of information by correspondence, articles published in the agricultural papers, bulletins, and by addressing farmers meetings of various kinds. We are also frequently called upon to present results of our investigation work at the conventions of Dairymen, Fruit Growers, Millers, Bakers, etc. These are all avenues by means of which we are privileged to spread the information we have collected and we cheerfully make use of them all. In August, I attended the meeting of the British Association for the Advancement of Science held this year in Winnipeg, and at a joint meeting of the Chemistry, Botany, and Agricultural sections read a paper on the milling and baking value of the characteristics grades of wheat of the Canadian West.

Laboratory Work.

During the past year the analytical work done under my own supervision has been chiefly along the line of cattle foods, human foods, insecticides and fungicides, milk and cheese. There has also been about the usual number of miscellaneous samples, some of which incurred considerable work, while others were very quickly examined.

The samples analyzed may be classified as follows: Cattle foods, 66; human foods, 43; insecticides and fungicides, 62; milk and cheese, 52; miscellaneous, 29; total 252.

CATTLE FEEDS.

All feeders of live stock are interested in the nature and composition of the ever increasing number of different kinds of mill by-products appearing on the market. Most of these materials are valuable additions to our lists of feeds and are residues from the manufacture of some specific product from the crops of the farm. They contain all the food constituents commonly found in fodders, roots, grains, etc., but in different proportions. For instance, the by-products, gluten meal and gluten feed, obtained in the manufacture of starch, are richer in protein than the corn from which they are made, because of the removal of starch. The same is true of wheat bran, because flour made from wheat is richer in carbohydrates than the wheat. Cotton-seed meal, linseed meal, brewers' grains, etc., are all of the same class. On the other hand, in the manufacture of oatmeal, one of the chief by-products is the hull of the grain, which is largely composed of crude fibre, a woody, comparatively indigestible substance which has very little food value.

In some cases the name of the by-product indicates its source and, therefore, the buyer can form some idea of its feeding value, but in other instances the name gives no indication of the source of the food or of its nutritive value.

As nearly all these by-product materials are valuable foods and their intelligent use is to be encouraged, we have analyzed all samples sent to us during the year and given the sender as full information as we could concerning their use. The results of the analyses are incorporated in the following table:

COMPOSITION OF VARIOUS KINDS OF CATTLE FOODS ANALYSED.

Serial Number	Name of Feed.	Moisture.	Crude Protein.	Crude Fat.	Crude Fibre.	Soluble Carbo-hydrates	Ash.
	(a) MILL BY-PRODUCTS †	%	%	%	%	%	%
17	Cotton Seed Meal	5.94	39.87	8.99	8.83	29.46	6.91
16	" "	6.82	36.50	9.11	9.62	30.90	7.05
7	Ground Linseed Meal	5.71	21.94	31.14	5.38	28.17	7.66
15	Linseed Meal	4.27	23.34	31.48	4.50	30.18	6.23
102	Oil Cake, nutted form	9.63	33.05	9.29	15.30	27.22	5.51
3	Gluten Meal	5.52	20.73	7.77	4.47	60.97	0 54
41	Gluten Meal and pea bran mixture	7.57	14.61	4.35	.....	*68.65	4.82
149	Gluten Feed	8.00	16.89	10.86	16.17	47.19	0.89
4	Dried Brewers' Grain	5.83	15.49	4.89	23.20	46.86	3.73
18	Re-ground Oat Hulls	5.69	2.39	1.98	27.98	55.88	6.08
246	" "	5.25	1.54	0.96	35.51	51.10	5.64
159	Oat Dust	5.57	12.36	6.06	21.76	48.06	6.19
32	Feed Oat Meal	4.56	15.15	7.45	3.05	67.38	2.41
54	Barley Germ Meal	5.96	17.16	7.42	.....	*64.77	4.69
61	Bran	7.50	13.94	5.38	10.42	56.92	5.84
78	Bran	.....	12.93	.....	.....	.....	.....
160	Bran	.....	14.78	5.39	14.89	.....	.....
64	Ground Cocoa Shells	7.50	13.96	3.92	17.80	48.12	8.70
1	Sugar Beet Meal	7.89	8.17	0.59	18.55	61.88	2.92
66	Beet Meal	9.10	7.63	1.12	18.45	60.90	2.80
	(b) MILL BY-PRODUCTS ‡						
2	Molasses Stock Food	6.43	9.05	0.50	11.22	65.93	6.87
33	Oat Feed	4.39	4.32	3.12	25.25	42.55	5.47
157	Oat Feed	5.24	4.54	2.15	31.41	50.82	5.84
22	Cattle Feeding Stuff	15.76	15.87	3.35	10.20	47.09	7.93
31	Poultry Meal	9.13	12.33	4.62	.....	*70.61	3.31
56	Manitoba Stock Feed	6.48	13.28	12.74	.....	*53.54	13.96
57	Cattle Feed	5.97	4.24	2.12	21.98	60.74	4.95
58	"	6.51	6.96	3.04	15.39	63.82	4.28
59	Banner Cattle Feed	7.50	6.79	3.63	8.56	70.51	3.01
247	" "	8.61	9.03	3.66	8.91	67.37	2 42
65	Molac Feed	8.40	14.30	4.05	10.78	57.17	5.30
103	"	11.58	14.09	4.60	13.77	51.00	4.96
248	Molac Dairy Feed	7.95	14.57	3.71	13.44	54.41	5.92
249	" Horse Feed	7 99	10.71	3,48	14.15	57 65	6.02
67	Ground Feed	7.30	12.29	7.00	9.56	53 87	9.98
70	Feed	8.10	14.47	4.65	17.61	48.77	6.40
72	Rex Sugar Food	11.30	8.37	2.07	4.97	60 09	13.20
82	Tillson's Calf Meal	7.50	22.30	8.96	7.90	47.74	5.50
83	" "	7.60	25.87	8.91	7.35	44.47	5.80
84	" Dairy Feed	7.60	16.25	5.25	17.39	48.01	5.50
85	" "	7.10	16,94	5.29	16.60	47.87	6.20
156	" " old standard	7.09	18.83	6.72	18 13	44.72	4.51
158	" " new standard	6.30	17.52	5.44	21.96	42.93	4.85
89	Dairy Feed	10.16	16,53	4.71	15.96	47.13	5.51
93	Stock Feed	9.28	11.71	7.15	14.18	45.88	9.80
154	Jersey Feed	7.09	11,19	4.95	20.73	51.88	4.16
155	Low Grade	6,80	17 51	9.86	10.01	52.40	3.42
161	Boston	6.63	6.18	2.20	27.66	52 81	4.52
162	Eagle	9.14	11.31	3.25	13.41	59.93	2.96
163	Edinboro	9.01	10.48	3.25	13.25	60.77	3.24

† Mill Products whose names give an indication as to their probable composition.

‡ Mill Products whose names give no indication of their probable composition.

* Including fibre.

COMPOSITION OF VARIOUS KINDS OF CATTLE FOODS ANALYSED.—Continued.

Serial Number	Name of Feed.	Moisture.	Crude Protein.	Crude Fat.	Crude Fibre.	Soluble Carbo-hydrates.	Ash.
		%	%	%	%	%	%
164	Dandy	8.92	10.33	3.29	10.50	64.11	2.85
165	Durham	8.25	9.74	3.17	13.80	62.00	3.04
166	Ruby	8.04	8.34	2.66	19.64	57.71	3.61
167	Mixed Feed	10.23	9.05	3.80	7.68	66.69	2.55
245	Purina Scratch Feed	10.05	9.91	3.84	4.06	70.46	1.68
250	Schumacher	8.17	11.54	3.92	11.51	61.61	3.25
251	Victor	7.44	8.57	3.67	13.58	64.75	1.99
	(c) FODDERS						
19	Silage No. I	72.31	1.38	0.41	6.66	17.87	1.37
20	" No. II	69.01	1.32	0.44	8.17	19.91	1.15
21	" No. III	51.53	2.36	1.40	8.68	33.71	2.06
37	Siberian Millet	5.24	6.05	2.50	32.26	47.68	6.27
111	Alfalfa	81.07	3.95	1.03	4.42	7.84	1.69
112	"	76.29	4.95	1.06	6.08	9.59	2.03
	(d) GRAINS.						
104	Whole Oats	10.58	10.27	5.10	12.36	58.71	2.98
100	Spring Wheat (Manitoba)	10.59	11.17	2.37	.....	*73.91	1.96
101	Fall Wheat (Alberta)	10.35	11.17	2.05	.....	*74.72	1.71

The two samples of cotton-seed meal are a little lower in protein and fat than samples analyzed in this laboratory and reported in Bulletin No. 138. The average results then obtained were: protein, 44.18 per cent., fat, 13.65 per cent.

Linseed meal, or oil-cake, is the residue left after extracting the oil from flax-seed by pressure or by fat solvents. The meals are, therefore, poorer in fat and richer in the remaining food constituents than the material from which they were prepared. Evidently two samples, Nos. 7 and 15, were not extracted residues, but probably ground flaxseed. Sample No. 102 is, apparently, pure nutted linseed cake and is slightly better than the most of the samples of these materials we have analyzed.

Good gluten meals should contain more protein than was found in the samples analyzed. Frequently, genuine gluten meals will have as much as 30 to 35 per cent. of protein, and the gluten feeds as much as 25 per cent. of protein.

Of the foods in class A, only one, No. 18, a sample of oat hulls, has less than 7 per cent. of proteids. Such a food is dear at any price to the farmer, who has plenty of fibrous materials in hay and straw. In fact, it is doubtful if it will pay a farmer who has plenty of home grown roughage to purchase feeds that carry less than 8 or 9 per cent. of protein. What he requires is feeds rich in protein to supplement the deficiency of that constituent in the coarser home grown materials.

There is a growing tendency to mix certain of the mill by-products and sell the mixture under a trade name which gives no clue to their probable feeding value. In buying such a food for the first time, a farmer must depend upon the statement of the manufacturer or his agent as to its nutritive value, or upon

the opinion of some one who has given the food a trial. This difficulty will be largely overcome when the Commercial Feeding Stuffs Act comes into force. This Act was passed by the Senate and House of Commons during the last session and comes into force on the first day of January, 1910.

This Act provides that no commercial feeding stuff can be legally offered for sale in the Dominion of Canada until it is registered with the Inland Revenue Department. It is then given a registration number, which, together with the guaranteed per cent. of protein, fat and fibre, must be affixed by the manufacturer, or agent, to every package of commercial feeding stuff sold or offered for sale. The statement required is as follows:

1. Name of Brand .....
2. Registration number .....
3. Name and address of manufacturer .....
4. Guaranteed analysis .....

This may either be printed on the sack, or a printed tag bearing the required information may be attached to the package.

The Act defines a commercial feeding stuff as follows: "Commercial feeding stuff," "feeding stuff," and "feed" mean any article offered for sale for the feeding of domestic animals, and feeds claimed to possess medicinal as well as nutritive properties, excepting only hay and straw, roots, the whole seeds or the mixed or unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat or flax seed; wet brewers' grain; the bran or middlings from either wheat, rye, oats, peas or buckwheat sold separately and not mixed with other substances."

It will be noticed that whole seeds or the mixed or unmixed meals made directly from certain grains are exempted, as are also bran and middlings from either wheat, rye, oats, peas or buckwheat so long as these are sold separately and not mixed with other substances. There was no desire on the part of the framers of the Act to in any way hamper trade in these commercial products. Therefore, these common, well-known products that are sold in large quantities locally, were not included in the Act. It is recognized, however, that fraud has been practised in the mixing of oat hulls with wheat bran, and that meal from mixed grains may be adulterated. To check this without putting the manufacturers to the inconvenience and expense of stamping the composition on the package, it was decided to deal with the adulteration of these products under the Adulteration Act. With the object of determining a fair standard composition, the chemist of the Inland Revenue Department collected and analyzed over five hundred samples of bran, middlings and mixed feed or "chop." Basing his decision on these analyses, and also on those made elsewhere, the chief chemist will recommend what he considers should be a fair minimum percentage of protein and fat and maximum percentage of fibre in pure products of this nature. Thus, if after all the analyses are completed he finds that good wheat bran should contain not less than 14 per cent. of protein, 3 per cent. fat and not more than 10 per cent. of crude fibre, these figures may be accepted as a standard for bran. If, then, bran offered for sale be found on analysis to contain less of the first two or more of the last named constituents, it would be deemed adulterated. It is expected that the adulteration of these more common products may be controlled in this way.

The Commercial Feeding Stuffs Act ought to be decidedly beneficial in three ways:

1. It will protect the stock feeder against low grade and mixed by-products with which he is not familiar.

2. It will protect the manufacturer and dealer against dishonest competition.

3. It will promote a more intelligent use of the mill by-products, and thus directly help to bring about a more economic use of all feeding stuffs.

It is to be hoped that farmers, dairymen, and all feeders of live stock will make themselves familiar with the terms of the Act, and so study the composition and price of the feeds offered for sale that they will be able to make the best possible use of these in supplementing the home grown roughage in producing economic gain, whether for growth or fattening or for milk production.

We have determined the digestibility of a large number of these mill by-products and hope to get the results out in bulletin form before the end of the year. These results ought to further aid in the intelligent use of these new and valuable cattle foods.

Corn Silage. The samples of silage were sent to us by H. Eilber, M.P.P., Huron County, in January last, with a request that we determine their feeding value. The desire for the information arose out of the fact that a number of the farmers of that county were discussing the proper stage of maturity to cut corn for the silo. The samples were collected by the farmers interested and the following notes supplied:

No. 1. Variety, Improved Leaming; silo filled on or about the 30th September; leaves and stalks green, about half the cobs glazed, the rest in the dough stage.

No. 2. Variety, Improved Leaming and Early Huron mixed; silo filled 20th September; leaves and stalks green; cobs few and milky.

No. 3. Variety, Early Butler; silo filled 5th October; leaves and stalks very dry; cobs well matured.

The samples were analyzed and are reported under "fodders" in the previous table. It is evident that the analysis confirms the note regarding the dryness of sample No. 3. Pound for pound, the No. 3 sample of silage is much superior to that of either of the others, but if we compare them on the basis of the composition of the dry matter, the superiority is not so evident.

Composition of Silage on Water-free Basis.

	Protein.	Fat.	Fibre.	Soluble carbohydrates.	Ash.
Silage No. 1.....	4.98	1.48	24.0	64.53	5.01
" 2.....	4.26	1.42	26.3	64.23	3.79
" 3.....	4.87	2.88	17.7	69.54	5.01

The more matured sample, No. 3 does not contain more protein, but very probably more of the total amount will be in the higher and more valuable condition. It does contain more fat and soluble carbohydrates and less fibre, so that, pound for pound, of actual dry matter the matured product is the most valuable. We have no figures to calculate the pound of each food constituent produced per acre, but, taking the data available, it is apparent that the better the corn is matured before it is put into the silo the more valuable the silage.

ALFALFA. Only two samples of alfalfa were analyzed during the year. These samples were taken from cuttings that were made from day to day on this farm for feeding animals stabled during the summer. The figures given show the composition of the material in the grass condition, or just after it was cut. The high percentage of protein is well worthy of note. It is higher than is found in red clover, about three times as much as is found in corn silage, and over five times that found in roots. If we figure the percentage of protein in the material in the hay condition, 15 per cent. of moisture, we find that it amounts to 17.6 and 17.7, respectively, more than is found in any of the cereal grains, and as much as many of the so-called concentrates carry. Of course, it is not so fully digested as many of these latter foods, but it is very evident that alfalfa is a valuable food. If dairymen would make more use of it in feeding cows, there would be less need for buying the expensive concentrated feeds which are not grown on the farm.

HUMAN FOODS.

Our study of human foods has been almost altogether confined to wheat and flour, although some analyses of honey, syrups, cheese and breakfast foods have also been made. We have prepared a bulletin on flour and breadmaking, which we trust will be of general interest, especially to the home bread-maker.

COMPOSITION OF DIFFERENT KINDS AND GRADES OF WHEAT OF THE CROP OF 1908.

Grade of Wheat.	Moisture.	Fat.	Carbohydrates..	Fibre.	Ash.	Protein.	
						Wheat.	Flour.
SPRING WHEATS:							
Cargo lots.—							
No. 1 Northern	9.82	2.31	70.51	4.28	1 60	11.48	10.97
" 2 "	10.39	2.21	70.39	3.79	1.70	11.52	10.82
" 3 "	10.46	2.37	69.35	3.90	1.69	12.23	10.88
Winnipeg sample.—							
No. 1 Northern	10.60	2.15	70.27	3.78	1.54	11 66	9.98
" 2 "	10.25	2.21	70.09	4.53	1.59	11.33	10.02
" 3 "	10 26	2.43	69.84	4.44	1.67	11.36	10.08
WINTER WHEATS:							
No. 1 Alberta Red.....	10.09	1.87	72.26	3.51	1.56	10.71	9.69
" 2 " "	10.05	1.68	72.31	3.73	1.54	10.69	9.54
" 3 " "	10.10	1.81	71.88	3.75	1.53	10.93	9.20
No. 1 Alberta White.....	10.39	1.97	71.34	3.86	1.97	10.47	8.31
" 2 " "	10.63	1.82	70.58	4.16	2.04	10.77	8.74
" 3 " "	9.85	2.09	72.73	3.42	1 54	10.37	8.88
Ontario Fall Wheat.....	11.56	2.77	72.81*	.....	2.12	10.74	.....

*Including fibre.

WHEAT. During the year we had to make chemical analyses of Manitoba wheat of the grades Nos. 1, 2 and 3 Northern from cargo lots, and from samples received directly from Mr. D. Horn, Chief Grain Inspector, at Winnipeg, also the grades of winter wheat grown in the Province of Alberta, known as Nos. 1, 2 and 3 Alberta Red and Alberta White. All the samples were of the crop of 1908. Because of the general interest in these wheats, we have recorded the results here and also the composition of a mixture of Ontario Fall wheat.

The samples received from Mr. Horn were taken from the accumulation of car samples drawn for inspection purposes. The samples of cargo lots were taken from the elevator at Goderich, and would probably be freer of variations due to environment, in that they would represent the car lots mixed in the Fort William elevators, then mixed in loading on to the boats, and again into the elevator at Goderich. There was a greater difference in the baking quality of the flour from these two sets of samples than there was in the composition of the wheat.

The Alberta Red wheat is really the same variety that is grown in Ontario under the name of Turkey Red, and in the State of Kansas as Kansas Red. It is a hard wheat and gives much heavier yields per acre in Alberta than it does here. In Ontario, this hard wheat tends to become softer and does not make as good a bread flour as that grown in Kansas. The Alberta wheat, while not quite so rich in protein as the Manitoba Spring grades, makes a strong flour, which, for some reason not entirely understood, does not make a good bread flour, and is used almost entirely for blending with the softer wheats, where it is found to be very valuable. The Alberta White wheat is the same variety as we know as Dawson's Golden Chaff, and, in so far as we can judge from the comparatively few tests we have made, it is a little better than our wheat of the same variety, but is not equal to the Amber varieties grown in Ontario. The sample of Ontario wheat analyzed was a mixture of a number of varieties of Winter wheat. The similarity in the composition of all the wheats analyzed is very striking, yet we find that they have very different baking qualities.

BREAD. The following table gives the weight of a loaf of bread from each of the different samples of wheat. Exactly 340 grams of flour was used in making each loaf. The yield of bread was determined as accurately as care, even temperature, etc., would allow, and, while they possibly do not represent the yield that would be obtained in a large baking, they are comparative. The volume of the loaf was carefully determined by displacement of fine seed and is given in cubic centimeters. The comparative color and texture of the bread and general appearance of the loaf are represented by figures; the No. 1 samples of the different kinds of wheat being assigned the full 100 points, and the others were scored in percentage of this.

As might be expected, the results show a great similarity in the quality of the bread obtained from the two lots of Spring wheats, but the samples representative of cargo lots are more uniform in quality than those obtained from the Chief Grain Inspector. This is doubtless due to the more thorough mixing of wheat produced from different localities and grown under varying conditions, thus obliterating the influences of environment.

It will be noticed that the flour from the Alberta Red wheats contained as much gluten as the Spring wheat flour, No. 1 sample even exceeding all others; but they are much lower in water absorption, yield of bread and size of loaf. The volume of the loaf was approximately only 75 per cent. of that of the Spring wheats. In our work with flour we have always found that, generally speaking, the small loaf was the heavy one, doubtless due to the lesser surface for evaporation

of water. No attempt was made to compare the quality of the bread with that from the Spring wheat as they are quite different; the texture particularly was not so good, the bread was darker, and the loaf had not that bold, fine appearance characteristic of the bread from the Spring wheats. In general, it was more like that obtained from the Durum wheats.

TABLE SHOWING WEIGHT, SIZE AND QUALITY OF A LOAF OF BREAD FROM 340 GRAMS OF EACH KIND OF FLOUR.

Grade of Wheat.	Per cent. of Protein.	Per cent. of wet Gluten.	Per cent. water absorb'd	Weight of loaf. Grams.	Volume of loaf. cc.	Quality of Bread.		
						Color.	Texture.	Appearance.
SPRING WHEAT:								
Winnipeg Sample.								
No. 1 Northern.....	9.98	33.10	67.2	511	2,540	100.0	100.0	100 0
" 2 "	10.02	31.20	67.5	503	2,520	102.0	98.0	98.0
" 3 "	10.08	30.17	68.0	496	2,770	102.0	96.0	96.0
Cargo lots.								
No. 1 Northern....	10.97	33.83	67.2	510	2,630	100.0	101 0	101.0
" 2 "	10.32	32.87	67.5	504	2,600	100.0	102.0	100.0
" 3 "	10.88	33.79	67.5	510	2,540	100.0	100.0	99.0
WINTER WHEAT:								
Alberta Red,								
No. 1.....	9.69	37.53	55.6	491	1,990	100.0	100.0	100.0
No. 2.....	9.54	32.83	55.6	481	1,900	95.0	96.0	100.0
No. 3.....	9.20	32.07	56.9	492	1,800	93.0	94.0	98.0
Alberta White,								
No. 1.....	8.31	27.97	50.3	472	1,480	100.0	100.0	100.0
No. 2.....	8.74	29.07	51.6	471	1,470	95.0	85.0	.....
No. 3.	8.88	27.90	51.6	482	1,600	97.0	104.0	108.0

FLOUR. The names assigned to the various grades of flour on the market are very numerous, as practically every flour miller has special names for his products. But, while there are a number of variations, nearly all flour may be graded as "patent," bakers', or straight. The well-known flours, Royal Household, Five Roses, and Purity, are patents which probably form about 35 per cent. of the total flour. Sometimes, however, the term "Standard patent," or "long patent," is used to designate a flour which forms about 90 to 95 per cent. of the total flour, and is, consequently, only a little better than a "straight." The "Bakers" grade, or "clears," usually represents about 55 per cent. of the flour after the patents have been taken off. A good bakers' grade of flour will yield about as much bread as a "patent," but the color of the bread is not so good. The low grade is got by grinding still closer to the bran layers and represents the remainder of the flour or about 10 per cent. The "straight" grade is the whole, or 100 per cent. of the flour from the wheat left in one grade. Of course, the percentage amount of the flour left in the various grades are not fixed, but are varied by every miller according to the quality of the wheat he is using, and the strength and color of the flour he wishes to produce.

We have analyzed a number of flours of various grades, and the bread made from them, but as the results are given in the bulletin on flour, we will not repeat them here. It will be sufficient to point out that it is a well recognized fact that the flour from the Western hard Spring wheats will produce a large, well-piled loaf of bread of excellent quality, and, because it absorbs a lot of water, it also gives a good yield of bread. These are desirable qualities and naturally explain why this class of flour is so popular for bread-making. The softer Ontario Winter wheat flour do not contain so much gluten and do not make so large, or, in the opinion of many people, so desirable a loaf of bread. This latter class of flour is, however,

the best for pastry and cake purposes. In most of our Ontario flour mills it is also used for making the blended flours, which are simply mixtures of the Spring wheat and Winter wheat flours. The object of blending is to secure a flour that will make a loaf of bread with some of the size and texture usually got from Spring wheat flour, combined with the flavor of that from the Fall wheats.

Nutritive Value of Bread from Spring Wheat and Winter Wheat Flours Compared.

As pointed out above, the Winter wheat flour does not make as large nor as heavy a loaf of bread as the flours from the Spring wheat. Frequently, the loaf will not be more than two-thirds the size, even when exactly the same weight of flour is used. This has prompted the question, "Which of the two loaves actually furnishes the most nourishment?" To answer this question, we made bread from two standard flours and analyzed the bread.

The flours used in this work were the patent and bakers' grades from Manitoba spring wheat, an 85 per cent. from the same grade of wheat and an 85 per cent. from all Ontario soft Winter Wheat. The bread was made in the regular way in our flour-testing laboratory; in fact, the loaves were taken from some of the regular testing work. In this work we use 12 ounces of flour for a loaf, and each lot of flour receives exactly the same amount of yeast, salt, etc., and all the water it will absorb. The bread was weighed, dried, and the whole mass ground to an impalpable powder and analyzed. The average results of a number of analyses are given in the following table. As the actual size of the loaves, their color, texture, etc., do not enter into the problem, these data have been omitted. It may be stated, however, that the bread was all of good quality. Naturally, the loaves from the Ontario flour were not so large, but the bread was a fair sample of that got from these flours:

Percentage Composition of the Bread.

Flour.	Average weight of loaf, gr'ms.	Water.	Protein.	Fat.	Carbo-hydrates.	Ash.
Patent	502	36.48	7.29	1.76	53.42	1.05
Bakers'	506	36.75	7.39	1.71	52.81	1.32
85% Manitoba	501	36.10	7.93	1.73	52.92	1.33
85% Ontario	468	32.90	5.74	1.63	58.58	1.15

It will be seen from the above that the 12 ounces, or 340 grams, of the various spring wheat flours produced about an equal weight of bread of very similar composition, while the Ontario winter wheat flour gave less bread with a lower water, protein and fat content, and a considerably greater amount of carbohydrates. This is as expected, as the soft flour is a starchy flour, poor in gluten, or, in protein.

In order that we may make a closer comparison of the amounts of the various food constituents furnished by each 340 grams of flour, the weight of protein, fat and carbohydrates contained in each loaf has been calculated and is given in the following table:

Flour.	Protein.	Fat.	Carbo-hydrates.	Ash.	Fuel Value.
Patent	36.60	8.84	268.17	5.27	1,399
Bakers'	37.39	8.65	267.22	6.68	1,393
85% Manitoba	39.73	8.67	265.13	6.66	1,388
85% Ontario	26.91	7.63	274.15	5 38	1,351

The bread from the Ontario winter wheat flour contains from 10 to 13 grams less protein, 1 gram less fat, and from 6 to 11 grams more of the carbohydrates.

It is generally assumed that, provided any given food is consumed as part of a well balanced dietary, the number of calories of heat it will produce when burned, or, in other words, its fuel value, is the best basis for making a comparison of the nutritive value. Taking this as the basis, we have the figures given in the last column. It will thus be seen that the soft wheat flour gave bread that contains approximately one-third less protein, or flesh-forming material, a little less fat, but more carbohydrates, and giving altogether nearly an equal food value. From these figures we must conclude that when bread is taken in the usual way as part of a mixed diet, bread from the soft wheat flour is nearly, or approximately, equal in nutritive value to that obtained from the hard spring wheats.

Flour Testing Work.

During the past year we have tested 218 samples of flour for millers and bakers. Most of the samples have come from this Province, but a few have been received from as far East as St. John, N.B., and as far West as the Rocky Mountains, and some from the State of Kansas. Only a few samples of wheat have been sent in for milling tests. The work has given us a chance to become familiar with the flour in use over a wide range of country.

The fact that we are prepared to do this type of commercial work is becoming more widely known among the millers, but we still get letters from millers enquiring if we do testing work. The bakers, who were really responsible for the installing of our flour-testing plant, have not sent many samples to us.

Every year we grind a number of samples of the standard grades of wheat from the West. This is done that we may make a comparison of the flour with that got from similar grades of the previous year. To see these results and to get information regarding the comparative strength of the various varieties of wheat grown on the College experimental plots, and on other subjects of general interest, the District Millers meet in our laboratory each Fall.

We are very pleased to be able to report that the wheat of this year's crop, both spring wheats from the West and Ontario fall wheats, contains more gluten and produces a flour that is much superior to that of last year.

Testing Varieties of Wheat.

During the past year we have milled and made baking tests of all the varieties of wheats grown on the Experimental Plots in 1908. It would add interest and value to the results if we could determine the yield of flour from each variety, but our mill is not suitable for this purpose, and, further, the amount of wheat available for the work is not sufficient. The best we can do is to make a straight grade flour from each wheat. We have only one year's test with the spring wheats and will not include them in the report of this year.

The following table gives the results of the baking tests with the Winter wheats of 1907 and 1908. The wheats of the 1908 crop were milled in January and allowed to age for two months before baking. They are all compared with a commercial straight grade flour which was used as a standard. The method of testing has been fully outlined in the reports of the last two years, consequently, it will not be necessary to repeat it here:

Table Showing Results of Baking Tests with Ontario Winter Wheats.

Name of Variety.	Crop.	Present absorption.	Net gluten.	Yield of bread.	Size of loaf.	Appearance.	Color.	Texture.	Quality of loaf.	Moisture.
		%	%	%	%	%	%	%	%	%
Standard	1907	47.0	26.01	100.0	100.0	100.0	100.0	100.0	100.0	9.78
	1908	48.8	27.17	100.0	100.0	100.0	100.0	100 0	100.0	8.37
Abundance	1907	47.0	24.00	101.5	95.2	98.0	102.0	100.0	100.0	10.38
	1908	49.4	27.53	98.3	80.7	100.0	96.0	97.0	97.6	8.07
Alberta Red	1908	57.0	28.9	103.7	100.0	97.0	100.5	102.0	99.8	7.57
Amherst Isle	1907	48.0	22.74	101.2	100.0	100.0	100.0	99.5	99.8	9.45
	1908	50.3	28.37	98.8	101.6	102.0	103.0	103.0	102.7	8.65
American Banner	1907	49.0	23.66	100.6	104.8	102.0	99.0	100.0	100.3	8.90
	1908	51.2	25.20	100.0	88.2	97.0	85.0	90.0	90.7	7.16
American Wonder	1907	46.0	23.8	98.3	99.4	97.0	99.0	95.0	97.0	9.68
	1908	50.6	24.07	99.4	90.3	97.0	90.0	98.0	95.0	7.69
Arctic Junior	1907	49.0	23.80	99.6	107.4	102.0	103.0	103.5	102.9	8.78
	1908	52.9	28.27	100.4	108.1	101.0	102.0	103.0	102.0	7.74
Auburn	1907	50.0	26.0	102.1	110.2	99.5	100.0	95.0	98.2	8.09
	1908	51.2	27.0	101.4	108.1	102.0	104.0	104.0	103.3	7.35
Banatka	1907	51.0	28.47	100.6	106.6	104.0	99.0	100.0	101.0	9.57
	1908	54.7	29.13	100.0	111.8	100.0	101.0	104.0	101.6	6.47
Bald Pootung	1907	49.0	25.11	101.2	102.4	100.0	100.0	98.0	99.3	10.92
Bearded Pootung	1907	50.0	27.57	100.6	106.0	102.0	102.5	104.0	103.8	8.85
	1908	56.2	27.04	101.2	94.6	101.0	100.0	100.0	100.3	7.58
Beardless Rural New Yorker	1907	48.0	24.42	100.0	97.0	100.0	100.5	100.0	100.2	9.55
	1908	50.9	24.81	100.2	91.9	99.0	100.0	99.0	99.3	7.43
Buda Pesth	1907	53.0	28.33	100.6	116.2	107.0	101.5	106.0	104.6	9.35
	1908	55.0	32.0	100.6	109.1	101.0	103.0	104.0	102.6	7.16
Bulgarian	1907	48.0	27.75	102.1	99.4	100.0	101.0	101.5	100.8	9.16
	1908	50.6	28.10	98.4	103.2	102.0	102.0	102.0	100.6	7.73
Clawson Longberry	1907	49.0	26.40	100.6	91.0	96.0	98.0	96.0	96.7	9.25
	1908	53.2	26.90	100.6	89.2	98.0	97.0	95.0	96.6	10.96
Crimean Red	1907	52.0	29.14	100.8	124.1	107.0	101.0	104.0	104.0	9.45
	1908	53.8	28.93	99.8	109.7	102.0	105.0	106.0	104.3	7.38
Dawson's Golden Chaff	1907	49.0	25.14	101.2	100 6	98.0	99.0	98.0	98.3	9.54
	1908	51.7	24.03	101.6	83.3	100.0	98.0	94.0	97.3	7.09
Economy	1907	48.0	25.66	99.4	106.6	102.0	99.0	97.0	99.3	9.87
	1908	51 7	27.43	98.8	103.8	102.0	103.0	104.0	103.0	7.40
Early Genesee Giant	1907	48.0	24.75	99.8	100.0	101.5	101.5	100.0	101.0	10 42
	1908	52.9	28.2	100.0	110 2	102.0	102.0	101.0	101.6	6.81
Early Ontario	1907	50.0	25.43	101.2	100 2	103.0	98.0	99.0	100.0	8.18
	1908	53.2	29.87	99.8	104.3	102.0	101.0	104.0	102.3	.....

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.—*Continued.*

Name of Variety.	Crop.	Present absorption.	Net gluten.	Yield of bread.	Size of loaf.	Appearance.	Color.	Texture.	Quality of loaf.	Moisture.
		%	%	%	%	%	%	%	%	%
Early Red Clawson.....	1907	49.0	24.97	101.6	97.0	98.0	100.0	97.0	98.3	10.02
	1908	54.1	26.23	102.2	82.3	103.0	101.0	99.0	101.0	7.42
Early Red Chief..	1907	49.0	26.88	100.6	98.8	100.0	100.0	100.0	100.0	8.35
Egyptian Amber	1907	49.0	24.06	100.1	111.4	104.0	101.0	102.0	102.3	9.03
	1908	51.5	27.73	98.6	107.5	105.0	110.0	106.0	107.0	8.18
Extra Early Windsor ...	1907	48.0	....	98.5	95.6	98.5	100.0	96.0	98.2	9.19
	1908	48.8	24.17	99.2	85.5	100.0	85.0	93.0	92.6	7.25
Farmers' Friend	1908	52.9	27.20	99.8	105.9	100.5	100.5	102.0	101.0	7.00
Forty Fold.....	1907	49.0	24.06	100.6	93.4	95.0	99.0	95.0	96.3	8.36
	1908	50.6	24.73	100.6	82.3	100.0	95.0	93.0	96.0	7.36
Geneva.....	1907	48.0	24.74	98.5	108.4	99.0	98.0	96.0	97.7	10.12
	1908	50.3	28.20	99.2	95.2	101.0	102.0	102.0	101.6	5.70
Genesee Reliable	1907	48.0	23.0	98.8	106.6	104.0	99.0	100.0	101.0	9.58
	1908	52.4	30.67	99.0	99.0	102.0	104.0	101.0	102.3	8.91
Ghirka	1907	50.0	26.74	101.5	112.0	102.0	100.5	105.0	102.5	9.32
	1908	50.3	27.57	98.4	103.8	102.0	102.0	103.0	102.3	.....
Harvest King..	1907	49.0	23.0	100 0	109.0	102.0	98.5	95.0	98 5	9.58
	1908	50.9	26.67	100 8	87.1	102.0	102.5	100.0	101.5	7.40
Imperial Amber.....	1907	49.0	26.97	100.4	104.2	103.0	98.0	100.0	100.3	9.45
	1908	50.3	27.30	100.0	96.8	100.0	100.0	99.0	99.6	8.40
Iron Clad.....	1907	50.0	30.38	100.4	104.8	98.0	98.0	100.0	98.7	7.99
	1908	54.7	31.27	101.0	111.3	102.0	104.0	106.0	104.0	6.79
Kentucky Giant..	1907	50.0	26.09	100.4	107.2	101.0	101.0	102.0	101.3	10.16
	1908	52.4	28.47	100.7	111.8	101.0	101.0	104.0	102.0	7.72
Manitoba Red Fife	1907	49.0	26.73	100.2	120.4	103.0	100.5	101.0	101.5	9.33
	1908	50.3	29.60	99.6	94.6	100.0	99.0	101.0	100.0	7.64
Michigan Amber	1907	49.0	24.78	101.9	107.2	102.0	102.0	104.0	102 7	8.46
	1908	52.3	26.70	100.2	95.7	100.0	102.0	100.5	100.8	6.77
Mogul.....	1907	48.0	25.72	98.8	94.5	99.0	101.5	98.0	99.5	10.16
	1908	53.2	27.60	101.0	86.0	102.0	100.0	100.0	100.6	7.35
Monarch.....	1907	51.0	25 65	101.6	103.6	102.0	99.0	102.5	101.2	9.27
	1908	49.7	28.43	99.4	93.0	103.0	103.0	103.0	103.0	8.46
McGarvin	1907	47.0	25.29	98.3	95.9	100.0	100.5	99.0	99.8	10.82
	1908	50.6	28.17	99.4	100.0	100.5	100.0	102.0	100.8	7.34
McPherson	1907	50.0	25.74	102.1	112.0	104.0	102 0	101.0	102.3	8.62
	1908	53.2	30.30	100.2	104.3	100.5	100.0	104.0	101.5	8.23
New Mammoth Amber...	1907	48.0	24.39	100 0	101.2	101.0	101.0	100.0	100.7	9.57
	1908	48.8	27.00	97.7	91.9	105.0	104.0	100.0	103.0	8.56

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.—*Continued.*

Name of Variety.	Crop.	Present absorption.	Net gluten.	Yield of bread.	Size of loaf.	Appearance.	Color.	Texture.	Quality of loaf.	Moisture.
		%	%	%	%	%	%	%	%	%
Never Kill	1907	48.0	25.92	98.5	94.5	99 5	98.0	96.0	97.8	9.95
	1908	49.7	26.23	97.7	99.5	100.0	100.0	102.0	100.6	7.09
New Invincible	1907	49.0	25.15	99.6	100.6	100.0	101.0	101.0	100.7	9.38
	1908	49.7	27.03	96.7	96.2	102.0	100.0	100.0	100.6	6.11
New Paris Prize	1907	48.0	23.34	99.6	98.8	98.0	100.0	98.0	98 7	9.62
	1908	49.7	24.07	99.2	83.9	101.0	96.0	94 0	97.0	8.76
Nigger Wheat	1907	49.0	27.66	100 0	99.3	100.0	102 0	105.0	102.3	10.42
	1908	52.6	28.17	101.4	102.7	101.0	100.5	102.0	101.2	7.61
No. 5 Red Wheat	1907	49.0	24.55	101.9	88.0	98.0	99.5	97.0	98.2	10.49
	1908	51.8	30.07	99.4	95.2	99 0	100.0	100.0	99.6	9.06
No. 8 Red Wheat	1907	50.0	23.07	101.7	99.4	97.0	99.5	96.0	96.8	9.75
	1908	50.0	26.83	99.6	80.7	99.0	97.0	95.0	97.0	8.27
Northwester	1907	48.0	25.01	99.8	100.0	96.0	100.0	97.0	97.3	9.96
	1908	49.7	26.04	99.6	92.5	103.0	105.0	100.0	102.6	8.12
New Perfection	1908	50.3	29.42	98.4	97.8	103.0	106.0	104.0	104.3	8.12
Onigara	1907	49.0	26.06	100.4	106.0	102.0	102.0	102.0	102.0	9.63
	1908	53.2	28.73	100.4	98.4	96.0	98.0	104.0	99.3	7.34
Padin	1907	48.0	24.42	99.8	104.9	100.0	98.5	99.5	99.3	9.87
	1908	48.8	30.43	96.5	105.9	99.0	100.0	103.0	100.6	6.16
Paramount	1907	48.0	25.08	99.6	105.4	103.0	103.0	104.0	103.3	10.32
	1908	52.3	28.30	99.2	91.4	102.0	100.0	100.0	100.6	8.45
Plymouth	1908	50.3	23.57	98.6	83.3	100.0	96.0	90.0	95.3	8.19
Prize Taker	1907	48.0	21.71	98.8	93.3	96.5	98.0	96.0	96.8	8.82
	1908	53.2	24.53	102.5	83.3	100.0	100.0	97.0	99.0	6.72
Prosperity	1907	49.0	24.81	98.5	97.6	97.0	98.0	98.0	97.3	8.66
	1908	49.7	26.10	97.3	88.7	100.0	100.0	100.0	100.0	5.39
Red Hussar	1907	48.0	22.62	97.7	91.5	97.0	101.0	94.0	97.3	8.13
	1908	50.6	26.23	97.5	87.6	100.5	95.0	85.0	93.5	8.65
Red Wave	1907	49.0	21.48	101.7	91.0	95.0	101.0	96.0	97.3	8.69
	1908	49.4	25.20	99.4	83.9	100.0	95.0	97.0	97.3	7.59
Royalty	1907	47.0	23.88	99.6	104.9	98.0	100.0	98.0	98.7	10.46
	1908	52.6	26.43	100.8	97.8	100.0	100.0	101.0	100.3	8.04
Rudy	1907	48.0	24.33	98.5	115.6	103.0	100.0	102.0	102.0	10.32
	1908	51.5	31.27	98.9	102.1	101.5	104.0	103.5	103.0	7.38
Russian Amber	1907	48.0	23.19	100.6	98.8	101.0	101.5	100.0	100.8	10.51
	1908	53.2	29.97	100.0	95.2	102.0	101.5	101.0	101.5	8.32
Scott	1907	49.0	26.97	102.1	109.7	102.0	101.0	104.0	102.3	9.36
	1908	54.4	31.40	100.2	109.7	100.0	102 0	104.0	102.0	7.18

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.—*Concluded.*

Name of Variety.	Crop.	Present absorption.	Net gluten.	Yield of bread.	Size of loaf.	Appearance.	Color.	Texture.	Quality of loaf.	Moisture.
		%	%	%	%	%	%	%	%	%
Silver Dollar	1907	48.0	23.55	98.3	98.8	101.0	102 0	102.0	101.7	10.36
Silver Queen	1908	50.3	28.60	100.2	80.1	101.0	98.5	100.0	99.8	6.97
Silver Sheaf Longberry	1907	49.0	25.26	99.6	93.0	98.0	96.0	97.0	97.0	9.32
Superlative	1907	.....	22.69	.....	.....	.....	.....	.....	.....	9.61
	1908	51.8	24.00	100.8	83.9	102.0	101.0	97.0	100.0	7.48
Tasmania Red	1907	52.0	28.44	102.9	112.0	103.0	100.0	96.0	99.7	8.18
	1908	53.2	28.67	100.6	105.4	101.0	105 0	102.0	102.6	9.05
Treadwell	1907	49.0	25.06	98.5	113.2	101.0	100.0	100.0	100.3	9.27
	1908	54.7	27.33	101.7	106.9	100.0	85.0	100.0	95.0	8.49
Turkey Red	1907	49.0	23.04	101.9	107.2	100.0	100.0	100.0	100.0	9.96
	1908	53.2	29.87	99.4	105.9	101.0	102.0	103.0	102.0	7.05
Tuscan Isle	1907	50.0	27.75	100.4	120.4	106.0	96.0	101.0	101.0	9.67
	1908	53.2	30.87	99.4	106.4	101.0	102.0	102.0	101.6	7.70
Yarsolaf	1907	50.0	28.49	100.4	109.7	105.0	94.0	102.0	100.3	9.21
	1908	52.3	28.17	99.8	108.1	100.0	103.5	104.0	102.5	7.31
Yenide	1907	48.0	25.50	100.4	105.4	98.0	100.0	94.0	97.3	9.78
	1908	50.6	29.57	100.8	107.5	101.0	99.0	100.0	100.0	7.75

Reference to the last column shows that the samples of flour from the 1908 crop were much drier than those of the previous year. This may be due to peculiarity of the season, but it is more probably a result of the flour drying out in the laboratory. The low per cent. of moisture would naturally increase the water-absorptive power of the flour, and, to some extent, the percentage of gluten and the yield of bread, but it would not affect the volume of loaf nor the quality of the bread. In view of the above remarks, we cannot say that the crop of 1908 is very much, if any, superior to that of 1907 in water absorption, gluten and yield of bread, while in most cases the volume of the loaf obtained is less, and the quality of bread is inferior. The latter point is best seen in the second last column, which gives the average quality of the bread. But, while there is this general falling off in quality, the varieties that gave the best results in the baking trials with the 1907 crop are found to be best in the crop of 1908. In this way the work of one year confirms that of the other.

THE INFLUENCE OF AGEING WHEAT AND FLOUR. The effect of age in wheat and flour was also tested again this year, but with a smaller number of varieties. The milling of the wheat for these tests was not done until September of this year. consequently, the wheat was about nine months older than when the previous samples were tested. The results of the baking tests are given in the following table:

TABLE SHOWING THE INFLUENCE OF AGE ON THE BAKING QUALITY OF FLOUR.

Name of Variety.	Baking.	Gluten.	Absorption, c.c.	Yield of Bread, grams.	Size of Loaf, c.c.	Appearance.	Color.	Texture.	Quality of Loaf.	Moisture.
		%	%			%	%	%	%	%
Standard	1st	27.17	48.7	486	1,860	100.0	100.0	100.0	100 0	8.37
	2nd	26.37	47.6	480	2,030	100.0	100.0	100.0	100.0	.....
Kentucky Giant	1st	28.47	52 3	489	2,080	101.0	101.0	104.0	102.0	7.72
	2nd	27.17	47.6	475	2,010	101.0	103.0	105.0	103.0	.....
Early Genesee Giant	1st	28.20	52.9	486	2,050	102.0	102.0	101.0	101.6	6.81
	2nd	27.73	47.6	472	2,040	102.0	104.0	102.0	102.6	.....
Dawson's Golden Chaff	1st	24.03	51.8	494	1,550	100.0	98.0	94 0	97.3	7 09
	2nd	23.03	47.6	475	1,770	95.0	104.0	100.0	98.3	.....
McPherson	1st	30.30	53.2	487	1,940	100.5	100.0	104.0	101.5	8.23
	2nd	27.67	47.6	480	2,020	106.0	105.0	110.0	107.0	.....
Treadwell	1st	27.33	54.7	494	1,990	100.0	85.0	100.0	95.0	8.49
	2nd	24.73	47.6	474	2,200	100.0	102.0	98.0	100.0	.....
Tuscan Isle	1st	30.87	53.2	483	1,980	101.0	102.0	102.0	101.6	7.70
	2nd	27.77	51.8	472	2,130	103.0	105.0	108.0	105.3	.....
Geneva	1st	28.20	50.3	482	1,770	101.0	102.0	102.0	101.6	5.70
	2nd	27.13	50.6	475	2,130	103.0	100.5	103.0	102.1	.....
Bulgarian	1st	28.10	50.6	478	1,940	102.0	102.0	103.0	102.3	7.73
	2nd	26 20	50.0	474	2,200	102.0	102.0	103.0	102.3	.....
Turkey Red	1st	29.87	53.2	483	1,970	101.0	102.0	103.0	102.0	7.05
	2nd	27.10	49.4	469	2,150	104.0	104.5	108.0	105.5	.....
Egyptian Amber	1st	27.73	51.4	479	2,000	105.0	110.0	106.0	107.0	8.18
	2nd	27.87	48.7	470	1,980	104.0	104.0	106.0	104.6	.....
Rudy	1st	31.27	51.4	481	1,900	101.5	104.0	103.5	103.0	7.38
	2nd	28.73	49.1	471	2,180	106.0	106.0	107.0	106.3	.....
Russian Amber	1st	29.97	53.2	486	1,770	102.0	101.5	101.0	101.5	8.32
	2nd	27.80	47.6	468	2,030	105.0	106.0	104.0	105.0	.....
Early Red Clawson	1st	26.23	54.1	497	1,530	103.0	101.0	99.0	104.3	7.42
	2nd	25.37	44.9	468	1,680	94 0	103.0	95.0	97.3	.....
Imperial Amber	1st	27.30	50.3	480	1,800	100.0	100.0	99.0	99.6	8.40
	2nd	25.67	47.6	480	2,050	104.0	105.0	104.0	104.3	.....

It will be noticed that the per cent. of wet gluten in the flour is in nearly every case lower at the time of the second baking than it was in the first. This corresponds with all our previous work, as we have always found that the flour from new wheat gives a higher percentage of gluten than it will after some months of ageing. The water absorption is also lower. This is probably due to the fact that the flour used in the first baking stood in the laboratory from January to March, when the building was heated, and, consequently, dried out very much. The low percentage of moisture given in the last column confirms this conclusion. The second

baking was made in September at the close of the summer season. No determination of the water content of the flour was made then, but it probably was much higher than in the spring. But, while the percentage of gluten and water absorption is lower, the volume of the loaf and the quality of the bread obtained in the second baking was much superior to that of the first test. It should be pointed out that the flour used as the standard in the two bakings was the same. The volume given in both bakings is the actual volume obtained, but as the standard had improved in quality with ageing, the figures for color, texture and appearance do not show the full improvement of the wheat and flour. Unfortunately, we have no way of illustrating this change, but it is evident that in nearly every case the volume of the loaf was very much increased and that the improvement in quality of bread from the various flours experimented with was equal to or better than that of the standard.

Blending of Soft and Hard Wheats. It is a well known fact that our soft Ontario winter wheats do not produce a flour that will make as large or as fine appearing a loaf of bread as the hard spring wheats. The soft winter wheat flour has not sufficient gluten to produce a large, well-raised loaf of bread, and the texture is usually comparatively poor. On the other hand, the strong flour from the Manitoba spring wheat yields a large loaf of good texture, but the bread is somewhat lacking in flavor. The blending of the two flours imparts to the bread some of the desired qualities of both and the result is the production of a loaf of bread that, while not so large as that made entirely from the hard wheat flour, is of good texture and flavor. Further encouragement is given to the use of blended flour by reason of the evident demand of the market for less volume of loaf and that more attention be paid to questions of texture and flavor of the bread. We have done what we could to demonstrate the value of these blended flours, and thus encourage the use of our home grown wheat. It is worthy of note that this year all the old Ontario wheat was used up long before the new crop was available.

The Influence of Chemicals Used in Fumigating Mills on Wheat and Flour. The materials used in our work were hydrocyanic acid obtained from potassium cyanide and sulphuric acid, carbon disulphide and sulphur fumes. The investigation is not completed, but the indications are that the hydrocyanic acid does little or no harm to flour, while sulphur fumes totally destroyed it for baking purposes. Carbon disulphide spoiled the flour for immediate use, but on exposure for some months it regained its original quality.

The Influence of the Stage of Maturity at which Wheat is cut on the Baking Qualities of the Flour is also under investigation, but we do not feel in a position to state the results as yet.

The Influence of Bleaching on the Baking Qualities of Flour. This is becoming a live question and one that must receive full attention in the near future. The Alsop Process Company of Canada have very kindly placed a machine at our disposal in order that we might have every facility for making a full study of the whole subject. This we hope to do during the coming season.

INSECTICIDES AND FUNGICIDES.

Each year a number of these materials are sent to us for analysis. This year we have analyzed a larger number than usual on account of the fact that we made a study of the lime-sulphur washes the past summer and personally collected 33

samples of these substances. Of the 62 samples of insecticides and fungicides analyzed, 42 were lime-sulphur washes. The rest consisted of Paris green (7), white arsenic (4), lead arsenate (5), sodium arsenate (1), copper sulphate (1), formaldehyde (1), and Bordeaux paste (1),

Mr. Fulmer has prepared the following notes on insecticides and fungicides:

Lime-sulphur Washes.

As the results of our work on these washes are being published in Bulletin No. 177, only a brief summary of it will here be given in which only the more salient points will be mentioned. The investigation was undertaken mainly because of the lack of definite information concerning the composition of these materials. The need for such knowledge has been much emphasized since the introduction of the so-called commercial Lime-sulphur washes. Without a knowledge of the composition of the home-made washes it is impossible to form a just estimate of the value of the commercial stuffs, outside of actual spraying experiments Composition of any substance also gives ground for criticism and opportunity to suggest lines of improvement in its manufacture and application.

Home-made Washes. Twenty-four samples of home-made washes were collected in the Niagara fruit district and analysed. Data collected concerning them reveal a great variety of methods for their manufacture, a large number of different formulae, and a marked difference in the strength at which they are sprayed. The amounts of lime in the formulae vary from 16 to 24 pounds, and of the sulphur from 15 to 19 pounds, to 40 gallons of water. The favorite formula in vogue is the old 20-15-40 one, but the tendency seems to be to slightly increase the proportion of sulphur, and, in most cases, the amount. The reason for this last is not apparent, for there is no doubt but that the efficiency of the wash made from the old formula, if boiling be properly carried on, is entirely ample and quite possibly more than ample.

The analyses show that the liquid part of the wash is made up of the following compounds: Calcium sulphide, calcium thiosulphate, calcium sulphite and calcium sulphate. The amounts of sulphur in the form of these different substances varied within the following limits in the 24 home-made washes analyzed, (pounds per 40 gallons of spray: As calcium sulphide, 6.29 to 13.28 lbs.; as calcium thiosulphate and sulphite combined, 1.96 to 4.20 lbs.; and as calcium sulphate, .09 to 1.70 lbs. The average amounts of the sulphur in these different forms were 10.41, 3.11 and .37 lbs., respectively. The total sulphur in solution ranged from 8.51 to 17.40 lbs. per 40 gallons, and averaged 13.89 pounds; the total lime in solution ranged from 5.49 to 10.72 pounds per 40 gallons, and averaged 8.49 pounds. The ratio between total lime and total sulphur in solution ranged from 1 : 1.41 to 1 : 1.89; and the percentage of the total sulphur in the calcium sulphide form ranged from 68.3 to 80.3.

The residue or "mud" present in the wash consists of lime, and very small amounts of free and combined sulphur, together with such substances as iron, aluminum, silica, and magnesia, and other impurities in the lime used. The total amount of lime and free sulphur left in the residue will depend on the formula used, the quality of the lime used and the thoroughness with which the wash has been boiled. A large excess of lime over sulphur in the formula will leave a large amount of lime in the residue, especially if the lime be of high quality; and a poorly boiled wash will have a large amount of free sulphur in the residue, and therefore other factors being equal, a correspondingly higher amount of free lime.

The value of free lime in a wash is low, especially all over a limited amount, an amount enough to whitewash the tree and improve the sticking qualities of the spray; and free sulphur is no more valuable than sulphur merely mixed with water and sprayed.

The valuable constituent of the wash is calcium sulphide, and the value is also considerably augmented by the presence of the thiosulphate and the sulphite. On the basis of the amount of these constituents present must the value of a wash be estimated, if only its composition be known. A wash is deemed especially active if it be high in calcium sulphide sulphur, and of two washes the one containing the greater amount of this compound per unit volume is the stronger. It will thus appear, according to the limits mentioned above regarding the composition of the home-made washes, that there is a great latitude in the strength of the wash as being used in the Niagara district, some washes being more than twice as strong as others. Every sprayer claims to be obtaining excellent results from his own wash, however, and for this reason it is impossible to settle on what strength should be the standard one. It would seem, of course, that the lower limit could be selected as a standard if it be producing results for those men who are using washes corresponding to it. But so much depends on degree of infestation, thoroughness of application, season, etc., that a recommendation of such a standard would not be advisable. There is great need for some work to be carried on in order to settle on the proper strength of wash that should be employed.

A very interesting fact brought out by the analyses of the home-made washes is that of the total independence of the strength of the wash upon the formula used. Although it is true that, other factors being alike, the strongest wash will be prepared from that formula containing the most sulphur, yet under the present status of knowledge among orchardists relating to the preparing of the wash, it is not the amount of sulphur, but the thoroughness of boiling that determines the quality of the wash. The following selected analyses of a number of the analyzed washes will illustrate this:

Sample No.	Formula.			Time boiled.	Total S. in solution. Lbs. per 40 gals.	Sulphide S. in solution. Lbs. per 40 gals.	Thiosulphate and Sulphite S. in solution. Lbs. per 40 gals.	Sulphate S. in solution. Lbs. per 40 gals.
	Lime lbs.	Sulphur lbs.	Volume gals.					
130....	20	16	40	40 min.	14.45	10.85	3.23	0.37
132....	20	16	40	1 hr.	11.55	8.46	2.72	0.37
135....	20	16	40	¾-1 hr.	15.90	12.22	3.05	0.63
133....	20	15	40	1 hr.	13.30	9.08	2.46	1.76
137. ..	20	15	40	1 hr.	14.30	11.48	2.59	0.23
146....	20	15	40	1 hr.	10.49	7.82	2.56	0.11
152....	22	18	40	*	17 40	13.14	3.90	0.36
153 b..	22	18	40	50 min.	15.64	11.91	3.59	0.14

* Until green color develops.

Examining the above figures it will be seen that it is not the formula which furnishes the most sulphur that produces a wash with the largest amount of soluble sulphur compounds; neither do the same formulae produce washes of equal strength. The factor which here introduces itself is the rate or thoroughness of boiling.

Weak, slow boiling, no matter whether it be by steam or direct heat, will produce a correspondingly weak wash no matter how much lime or how much sulphur be used. It is without doubt that to this factor of incomplete, unthorough boiling, can be attributed most of the conflicting views held regarding proper formulae and methods of boiling, etc.

Boil vigorously and any of the recognized formulae will produce excellent washes.

Commercial Washes. The commercial brands of Lime-sulphur washes are now becoming quite common and are giving excellent results wherever used. They are an especially convenient form of the wash for summer spraying work.

When these washes were first introduced, fruit growers were naturally dubious as to their usefulness, and as to whether they would be safe to apply or not. But it was soon found that their action was similar to that of the home-made washes, showing that they were likely similar in nature, composition and source.

We have analyzed seven samples of these materials, representing the Vanco, Grasselli, Rex, Sherwin-Williams, and Niagara brands. They are all clear solutions, except the Niagara, which contains the "mud." In composition and strength they are much alike, but some brands are not so uniform in strength as they should be. Their analyses show them to contain the same constituents as do the home-made washes, but they range from 8 to 10 times or more stronger than do the home-made ones. Further, which is an important fact, they do not form crystals on standing if kept protected from the air. They do form crystals, however, when lime is added to them, just as do the home-made washes, and this must be borne in mind when handling them. If lime be used with them, it should be put in only just before spraying and after the water is added.

One of the greatest difficulties in using the commercial brands is to know how much water to add. The manufacturers recommend the addition of such and such a quantity of water, but such an amount may be over or under the amount necessary. A chemical analysis of the wash would show how much dilution would be required, but such a method would be very inconvenient. A more ready means is needed. Dilution on the basis of the specific gravity forms a very ready and quite an accurate method, and one which can be highly recommended. Suitable hydrometers, those made for heavy liquids, and ranging from 1,000 to 1,400 on the graduated scale, can be secured for 75c. to $1, from any firm dealing in supplies of that kind.

When the specific gravity is known, the number of gallons of winter spray which one gallon of the concentrate will make can be determined by dividing the decimal part of the reading by .028. Thus, one gallon of a commercial brand having a sp. gr. of 1.28 will make $\frac{28}{028}$=10 gallons of spray, *i.e.*, each gallon of concentrate will require 9 gallons of water.

Home-made Concentrates. With the increasing favor of the commercial brands, or concentrated Lime-sulphur solutions, the question naturally suggests itself: Is it possible to make such solutions on the farm? If they can be made they will no doubt displace the commercial stuffs to a great extent, because of less cost.

From the work which we have done here, we have found that a home-made concentrate can be successfully made, and of such a nature as to compare favorably in every way with the commercial articles.

Full directions for preparing and handling these concentrates will be found in the bulletin on Lime-sulphur Washes.

Paris Green.

This substance still forms a popular and standard arsenical for combating biting insects. Seven samples were received and analyzed for total arsenic:

Sample No.	Total Arsenic as As_2O_3 %	Sample No.	Total Arsenic as As_2O_3 %
36	57.32	76	58.37
43	57.29	77	57.67
52	57.44	108	50.2
73	56.16		

Pure Paris Green is known as copper acetoarsenite and contains 58.65 per cent. As_2O_3. But owing to impurities not entirely removed in manufacture, it usually falls slightly below this figure. A good, well-made green, however, should not fall below 56.0 per cent. If an analysis shows less than this amount, either adulteration has been practised or the Green has been carelessly manufactured. Only one sample, No. 108, in the above list is of doubtful quality; all the others are genuine.

White Arsenic and Sodium Arsenate.

These two substances are used for making the home-made arsenite and arsenate, respectively, of calcium or lead. Their usefulness for this purpose depends on their purity, especially when the person using them is only able to follow the directions given in the various stated formulæ.

The four samples of white arsenic were of splendid quality, only one falling below 100 per cent. purity. This one was 97.36 per cent. pure.

The sample of sodium arsenate was also of a very high quality, practically 100 per cent. Na_2HAsO_4. $7H_2O$.

Lead Arsenate.

This arsenical is now becoming very popular and is replacing Paris green to quite an extent. This is because it is always absolutely safe to apply even on the tenderest of foliage, which is not by any means true of Paris green; and, further, because of the facts that it stays well suspended in water on account of its extremely fine division, and that it adheres firmly to the bark or foliage, and therefore exerts its influence over a long period of time.

Lead arsenate can be manufactured very conveniently and cheaply on the farm from sodium arsenate and lead acetate, (see Bulletin No. 154, p. 12, Ont. Dept. of Agri.); but at the present time the most of that used is bought ready prepared. Several brands are on the market, most of them in what is known as paste form. We received one sample this year, however, which was in liquid form, more nearly in a condition for spraying than the pastes, but of course much lower in arsenic than the latter. The pastes are usually sold on the basis of 40 per cent. of moisture, in which case they should contain about 15.0 per cent. of As_2O_5. If a greater moisture content is possessed, then a proportionately larger quantity is or should be given for the same money, and a correspondingly greater quantity must also be used for spraying.

The following table shows the analysis of the samples which we received:

Sample No.	Form.	Per cent. moisture.	Per cent. $As_2 O_5$	Per cent. $As_2 O_5$ on 40 per cent. moisture basis.
45	paste,	42.13	15.57	16.39
88	paste,	54.39	10.23	13.91
109	paste,	48.18	9.74	11.73
150	paste,	31.05	14.9	11.56
152	liquid,	.... .	3.4	.....

It will be seen that the samples are not at all uniform in composition and that the most of them run low in arsenic.

Bordeaux Paste.

This substance is merely the ordinary Bordeaux Mixture from which the excess of moisture has been removed. It, as a fungicide, is made on the same principle as the Lead Arsenate paste, an insecticide. By the addition of water a spray of any desired strength can be made from it.

The sample which we analyzed contained 6.42 per cent. of Copper oxide, CuO, an amount which is equal to 20.23 per cent. crystallized copper sulphate or bluestone ($CuSO_4 . 5H_2O$).

According to the recognized formula:

4 pounds bluestone,
4 pounds lime,
40 gallons water,

for Bordeaux Mixture, one pound of this paste would be enough to make 2.02 gallons of spray of equal strength. The paste also contains the lime, so it is equal in every way to the ordinary home-made Bordeaux, provided its flocculent condition be not destroyed in any way so that it will remain suspended in water to the same degree as the home-made does.

The following figures show the composition of the one sample analyzed:

Copper oxide (CuO), 6.42%=20.23% $CuSO_4 . 5H_2O$.

Lime (CaO), 19.85%.

DAIRY EXPERIMENTS.

Losses in Making Cheese from Normal and Over-ripe Milk.

It has been known for a long time that milk received at the factory in the slightly sour or over-ripe condition would not produce so many pounds of cheese as milk received in the sweet or normal condition. During the past season we tried to get some data showing the amount of these losses and of what they consist.

One of the chief difficulties in the work is to secure representative samples and accurate weights of the milk and cheese. Because of this difficulty we first studied the loss of total solids and protein in the whey from normal and over-ripe milk used in the manufacture of cheese in the small vats of the Experimental Dairy

Department. It was claimed, however, that the conditions were not comparable with those found in the large vats in actual factory practice. This year, after consultation with Mr. F. Herns, Chief Dairy Inspector, and his assistant inspectors, we decided that as it was impossible to collect and weigh the whey from the large vats in use in the factories, we would study the matter from the standpoint of the protein and fat recovered in the cheese.

With this end in view, arrangements were made with seven cheesemakers who were recommended as painstaking and accurate, to co-operate in this work. The factories were visited and the work talked over with the men, and the following sheet of instructions supplied. Sheets for recording required data were also furnished, and bottles for the samples.

Sheet of Instructions.

Weigh accurately in a vat milk which you consider will be fast working (over-ripe). Mix the contents of the vat thoroughly by means of the agitators and then determine the acidity of the milk with the acidimeter; and also at this stage take a sample of the milk in the small narrow-necked sample bottle supplied. Now proceed in the ordinary way for setting, dipping, milling, etc., being careful, however, to keep the curd of this vat entirely separate from that of any other vat. In order that the vat will make an even number of cheese of your ordinary size make. take the quantity of milk which you find by experience will give the proper quantity of curd. This is very necessary since it is essential that the weight of all the cheese made from this vat be determined.

When the cheese come from the press the following morning weigh them accurately, and then sample them at once by withdrawing a small plug from each by means of the trier. Place the plugs in the wide-mouthed sample bottle supplied and screw the cap on tightly.

Mail the samples to us as soon as possible after obtained. In order that the milk sample shall reach us in a sweet condition, 3 or 4 drops of the formaldehyde which we furnish is to be dropped into the sample as soon as taken and mixed with it. The cheese need not be preserved in this way.

This experiment should be carried through six times, if possible; and, in order to obtain comparative data, six experiments wherein normal working milk is used instead of over-ripe milk, must be conducted. It is not essential that these experiments be carried out the same day as those with the over-ripe milk, but, if it is possible to do so, it would be as well. This will make a total of twelve experiments in all. Your own convenience must be consulted, however, as to the number of experiments which you run through.

All data are to be recorded on the sheets furnished for that purpose, and sent to us as indicated.

Please number the samples of milk from one up, irrespective of whether it is normal or over-ripe milk, and give the cheese sample the same number as the milk from which it is made.

A total of 52 samples of milk and cheese were received, 10 of normal milk, 10 of cheese from normal milk, 13 of over-ripe milk, and 13 of cheese from over-ripe milk. The per cent. of protein and fat in the milk and cheese was determined, and from these percentages and the weight of milk and cheese supplied, we calculated the total weight of protein and fat. The difference between the weight of these constituents found in the milk and recovered in the cheese represents the

weight of protein and fat lost in the whey. The results obtained were not uniform. In some cases the loss of protein and fat from the over-ripe milk was greater than from the normal, and sometimes the reverse was true. The variation was greater in the case of the fat than the protein, but in nearly every instance the difference between the losses from normal and over-ripe milk were very small.

The average losses of protein and fat per 100 pounds of normal and over-ripe milk and the weight of cheese made per 100 pounds of milk are given in the following table:

Kind of Milk.	No. of Samples.	Protein. lbs.	Fat. lbs.	Cheese. lbs.
Normal	10	.735	.338	9.17
Over-ripe	13	.778	.337	8.31

The last column of the table shows that 100 pounds of over-ripe milk produced 86 pounds less cheese than the normal milk, yet there was apparently approximately as much protein and fat recovered with one kind of milk as with the other. In our previous study of the question, where the loss of solids in the whey was determined directly, there was practically no difference in the amount of solids lost in making cheese from the normal and over-ripe milk. Apparently, then, both methods of studying the subject point to the same conclusion, namely, that the loss of solids is no greater in making cheese from over-ripe milk than from normal milk. Yet, the above table shows that there is nearly one pound less cheese made from 100 pounds of one kind of milk than from the other. Unfortunately, when studying the loss of solids, we did not determine the moisture content of the cheese. It is possible that the difference is due to the over-ripe milk producing a dryer curd and cheese.

We did not receive as many samples of milk and cheese as we expected, and, while the results obtained corroborate the results of previous work, we feel that more time will have to be given to this subject next season, including a study of the moisture content of the cheese, before we are in a position to draw definite conclusions regarding the matter.

Whey Butter. Several samples of whey butter were analyzed in the ordinary way, and also to determine if there was any change in the nature of the fats, but, so far as the work was continued, no difference was found between whey butter and the ordinary butter.

Acknowledgments.

In conclusion, I beg gratefully to acknowledge the loyal assistance of all those associated with me in the work of the department of Chemistry, and the hearty co-operation of the various College departments in carrying out of our work during the past year.

Respectfully submitted,

R. HARCOURT.

PART VII.

THE PROFESSOR OF SOIL CHEMISTRY AND LECTURER IN GEOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my annual report for the year 1909.

The nature and scope of the work in Soil Chemistry, Inorganic Chemistry and Geology, is indicated by the College Calendar and requires no extended notice here. Since August 1st, Mr. A. E. Slater has shared the work with me, and the ground has been covered as fully as the time allotted to these subjects permits, though more time could be used to advantage in some branches. I might also add that a series of lectures were delivered in Elementary Agricultural Chemistry, embracing a study of soils, fertilizers and crops, and also a series of lectures to the Horticultural students of the Short Course, on the function and uses of fertilizers.

INVESTIGATIONS.

During the past year we have conducted experiments along several lines, which we may enumerate briefly as follows:

First, the chemical composition of certain type soils; second, the economic use and application of commercial fertilizers; third, the power of legumes to fix atmospheric nitrogen; fourth, the examination and hygienic improvement of water supplies from various sources. Further, we have also examined and reported on much miscellaneous material, such as suitability of rock for road building, also the economic value of certain minerals submitted for analysis. In connection with our mineralogical work, it may be stated here that a large and valuable addition of minerals has been added to our museum and laboratory collections, for the use of students. In view of the importance of this branch, which will be mentioned later, I would request that a liberal appropriation be made for the necessary materials to carry on this work.

SOIL INVESTIGATION.

The work in soil investigation covers so wide a field, and introduces problems of so intricate and complex a character, that it necessitates the most continuous and careful work. While we have not been able to make a complete soil survey of the Province of Ontario, the importance of the work cannot be overestimated. In proof of this it might be stated that only this year the State of Illinois has made an annual grant of $60,000 for soil survey work alone. Soil examination in Ontario offers even greater problems than does that of the State of Illinois, because of the immense diversity of our soil types. But if this Station is to help the farmers in solving certain difficulties, which will be mentioned later, it will necessitate more funds and more labor from year to year.

This year we have been called upon to examine and suggest remedies for alkaline soils, acid soils, barren spots bare of all growth, unfertile soils yielding but poor crops, and soils suffering from toxic materials and plant poisons.

Acid Soils.

In conection with our work on acid soils, it may be stated that much has been done. This work, however, has been carefully put together in bulletin form, which is now in the printer's hands, and, therefore, will not be discussed here. The problem in connection with these soils and their crop producing powers is a most intricate one, but one of much practical importance in this Province.

Alkaline Soils.

While alkaline soils are not common in the Province of Ontario, several samples have been submitted to us this year for examination. In most cases, however, the alkali substance has been that known as white alkali (sodium sulphate) and not the more injurious black alkali (sodium carbonate). In both cases, however, the evil must be removed before satisfactory crops can be raised. The process consists in:

1. Reducing surface evaporation to the lowest possible point.
2. Neutralizing corrosive salts by chemical antidotes.
3. Introducing drainage and leaching by underdrainage and flooding.

Frequent and deep tillage will tend to prevent surface evaporation; also the growth of root crops, which absorb a large quantity of soluble salts, so that cereals may be grown the second or third season. Underdrainage will lower the water table and carry off the injurious materials. Black alkali can be corrected by the addition of gypsum (calcium sulphate), about 500 to 1000 pounds per acre, followed by small annual dressings.

Samples of soil in ever increasing numbers are being submitted to us for examination. While little is to be gained by the complete analysis of individual and isolated samples, the analysis of certain fixed types of soil is of considerable value, and this we endeavor to do as far as possible. Soils are also examined for certain fertilizing constituents, or for the presence of injurious plant poisons, or other causes through which barrenness and unfertility may result.

Work with Fertilizers.

With the ever-increasing use of fertilizers throughout the Province, the question of their economic use and application is one of deep significance. Though as yet they are not as widely used as in the States, yet we believe the time is surely coming when they will constitute a very prominent and necessary feature of farm methods. The fertility of our richest soils must of necessity be depleted by continuous cropping, unless the fertilizing materials be returned to the soil. Continuous grain raising, unless stock be kept, cannot be followed for years without the liberal application of commercial fertilizers.

Because of the crowded nature of the farm land, and lack of help, it has been impossible to conduct a series of fertilizing plots here, under my own supervision. Such work would be of the highest value to the practical agriculturist. To insure accurate work with fertilizers, one on which to base conclusions, it is desirable to have the conditions as uniform as possible and to carry them out on the same plots for a number of years with different crops. I, however, planned a series of fertilizer experiments for co-operative work amongst our farmers. Much information of a valuable nature has been secured, a full account of which is to be found in the Annual Report of the Experimental Union for this year.

I would like to impress here the value to the farmer of conducting a series of simple fertilizer experiments on his own farm. Such an experiment will give him more knowledge and a far better idea as to the requirements of his soil than any complete soil analysis can furnish him with. The following plan for experiments with fertilizers has given good results. A series of plots of as uniform a nature as possible, 2 rods by 2 rods, which is 1-40 of an acre, treated as follows:

Plot No. 1.	No fertilizer.		
" 2.	Superphosphate,	400-500 lbs.	per acre.
	Potassium sulphate,	120-160 "	"
	Sodium nitrate,	120-160 "	"
" 3.	Potassium sulphate,	120-160 "	"
	Sodium nitrate	120-160 "	"
" 4.	Potassium sulphate,	120-160 "	"
	Superphosphate,	400-500 "	"
" 5.	Sodium nitrate,	120 "	"
	Superphosphate,	400-500 "	"

If corn is the crop experimented with, it might be as well to increase the size of these plots to 1-20 or even to 1-10 of an acre.

Application of Fertilizers.

The application of the Potash and Superphosphate should be made broadcast before planting, preferably some weeks before. The nitrate is very soluble, and is easily leached from the soil; consequently, it is best applied in two or three applications, one at time of sowing seed, the next shortly after germination, and the last application when the growing crop is two or three inches high. This will supply the nitrogen all in the stage of early growth, when it can be utilized by the plant to the best advantage.

Preference Shown by Plants for Different Forms of Food.

It is a fact of great interest and importance that one form of fertilizing constituent is preferred by some plants to the same constituent in another form. This preference is indicated by greater yield, or by better quality, or by both; thus, wheat seems to give better results when nitrogen is applied in the form of nitrate of soda than in any other form. Spinach has been found to do better with sulphate of ammonia than with nitrate of soda, while the reverse is true of asparagus. The quality of tobacco is injured by potash in the form of muriate, and hence only sulphate should be used for fertilizing purposes. The quality of sugar beets and potatoes appear to be better when sulphate of potash is used. Hence, while the soil may contain certain quantities of fertilizer naturally, it would pay to give serious attention to the so-called chemical fertilizers, and to their nature and source.

Use of Fertilizers.

There is no way to tell without experiment what food constituent a soil lacks. The crops themselves give valuable suggestions. As a rule, lack of nitrogen is indicated when plants are pale green in color, or when there is a small growth of leaf or stalk, other conditions being favorable. A bright deep green color with vigorous growth of leaf or stalk is in the case of most crops a sign that nitrogen

is not lacking, but does not necessarily indicate that more nitrogen could not be used to advantage. An excessive growth of leaf or stalk accompanied by imperfect flower and fruit development indicates too much nitrogen for the potash and phosphoric acid present.

When such crops as corn, cabbage, potatoes and so forth, have a luxuriant, healthful growth, an abundance of potash in the soil is indicated, also when fleshy fruits of fine texture and flavor can be grown. On the contrary, when these plants fail of luxuriant growth, or are very low grade in quality, it is a certain indication that potash is lacking. When a soil produces good, early maturing crops of grain, with plump and heavy kernels, phosphoric acid will not generally be found deficient in the soil.

In order, therefore, to ascertain with greater certainty what food constituents are lacking in any particular soil, the surest, in fact the only way, is for each farmer to conduct experiments on his own soil and crops. Apply fertilizers as indicated in the preceding tables. The results can then be studied and the yield of crop. In carrying on such experiments, several difficulties may be met. The season may frequently be such as to interfere seriously with the favorable action of the fertilizers applied. Thus, severe drought may counteract all other conditions and prevent a satisfactory yield. The difference in the mechanical condition of the soil of the same farm, or even the same field, may prevent a fair comparison of the action of the different kinds of fertilizing materials. A late, wet spring may also interfere. But notwithstanding these difficulties, valuable suggestions will be obtained from an experimental study of one soil through the behavior of the crop.

Suggestions Regarding the Purchase of Fertilizers.

It will generally be found more economical to purchase separate fertilizing ingredients, rather than mixtures. In applying fertilizers, bulk is often desirable, but in purchasing commercial fertilizers the object should be to secure as much nitrogen, potash and phosphoric acid in available forms as possible for one dollar, instead of as many pounds as possible of fertilizer regardless of the amount of plant-food contained in it. This is particularly applicable to mixed fertilizers. Since there is smaller bulk to handle in mixing, a smaller number of packages for holding, and, consequently, less weight and freight, as before stated, it is, as a rule, more economical to purchase fertilizers in their more concentrated forms. For example, it is more economical to purchase one ton of a high-grade fertilizer than three tons of a low-grade fertilizer, one ton of the former containing the same amount of plant-food contained in the three tons of the latter; because, in making the latter, three times as many packages are required and three times as much freight must be paid for the same amount of plant food.

Fertilizers cannot, as a rule, be too finely ground, nor can they be too dry. With many materials, bone for example, the availability as plant-food is directly dependent upon the fineness of division. Excessive moisture in fertilizer is undesirable for several reasons. First, the larger the amount of moisture, the smaller will be the amount of plant-food; second, excess of moisture causes the particles to stick together, and is likely to result in caking; third, an excess of moisture favors the decomposition and loss of nitrogen in many forms of organic matter.

Fertilizers for Different Types of Soils.

As our knowledge of the fertilizer requirements of different types of soils found in Ontario is incomplete, we cannot always give definite information as to which fertilizer or fertilizers will give the best results in every case. The following general suggestions with regard to this question are in accord with our present knowledge of the principles involved.

Soils which have been largely depleted of their plant-food through continuous cropping and which respond readily to applications of barnyard manure, should receive a general fertilizer containing all three constituents of plant-food—nitrogen, phosphoric acid and potash.

Sandy and light soils are especially benefited by applications of potash, and will not, as a rule, be benefited by phosphates—basic superphosphate excepted. The clay, clay loam, and loam soils, on the contrary, do not often need potash, but are frequently improved by applications of phosphates. As stated in a recent bulletin,* acid soils (indicated by litmus paper test) will respond to applications of lime and available phosphates.

Muck soils are rich in organic matter and usually in nitrogen, and, as a rule, require potash and phosphoric acid, and sometimes lime. In our experiments we have found that potash, or, still better, potash and phosphates, have greatly increased the yield of grain on swamp areas. In some cases we have found that these soils in our Province do not need lime, but in other cases we have found that lime, especially in the form of ground limestone, has given good results. Light sandy and clay soils are also benefited by dressing with lime.

It may be stated, as a general proposition, that soils of different types are likely to be especially benefited by the following system of fertilization: Sandy soils by nitrogen and organic matter; muck soils by potash and phosphates; clay soils by lime; and all acid soils by finely ground limestone.

Amounts of Fertilizers to be Applied.

No hard and fast rules can be given as to quantities of artificial fertilizers to be applied, as the amounts necessary to produce large crops will vary with the character and the state of fertility of the soil, the kind of crop to be grown, the time and manner of application, and other conditions. For ordinary farm crops from 500 to 700 pounds per acre may be considered a fairly heavy application; applications of from half a ton upwards will only give economical returns in cases of special crops grown under an intensive system of farming.

Water for Domestic Purposes.

There has been a growing demand in this Province on the part of farmers, as well as citizens in general, for an examination of waters with reference to their fitness for domestic purposes. During the past year this demand has increased and it is not easy to understand on what ground a matter of such vital importance to health can be ignored, even though there are other lines of investigation work of great importance to be conducted in Agriculture. The examination of doubtful water certainly meets an important public demand.

* See Bulletin. Character and Treatment of Swamp Soils.

Pollution of Water.

In this section of the country, where so few deep wells exist and where we are almost entirely dependent on surface water for our supply, it is this class of water which most naturally interests us.

No surface water is free from animal and vegetable life. It is seldom, however, that any trouble arises from this cause when the water is taken directly from running streams, but the water in lakes and ponds and in storage reservoirs is very liable to be disagreeably affected by the growth and decay of animal, and, more especially, of vegetable organisms. The presence of fish in a source of water supply is rather an advantage than otherwise; however, cases arise in which for various causes a large number of fish die, consequently the source of supply must be watched and the dead fishes carefully removed. Other forms of animal life are abundant, but, fortunately, are easily removed by filtration.

One of the principal sources of vegetable contamination is fresh water *Algae,* which grow in nearly all water supplies. The disagreeable odor and taste of water, as "woody," "musty," and "fishy," can usually be traced to these plants. Their presence is not really a sign of pollution, but it is a fact that they thrive best in waters containing mud and vegetable extractive matters.

Sanitary chemists agree that the dangerous constituents of water are the products of organic decomposition, and the germs that feed upon them; hence, water that has been contaminated by sewage, by seepage from out-houses, etc., are uniformly condemned for potable use.

The question is frequently asked: "What is a pure water, suitable for drinking purposes?" or, "What are we to understand from the result of the analysis submitted?" The analytical chemist is not, however, especially concerned directly with the question as to the presence or absence of disease germs, and this phase of the question is left to the consideration of the bacteriologist. But the solids and organic matter are here more fully considered. The constituents to be examined for, in general, may be divided into two classes: organic and mineral matter.

A careful examination of the character of the organic matter frequently helps to throw light upon the likelihood of such water being contaminated, especially by sewage and other waste products which might make a possible source of typhoid fever infection.

The organic matter in water consists of what is known as albuminoid and free ammonia. Of these two, the albuminoid ammonia is by far the more important and is to be taken as an indication of pollution from either or both animal and vegetable sources.

Chlorine is the measure of the amount of chlorides in the water, and may come from chlorides naturally in the soil, or when in very marked quantities in inland waters is usually from sewer contamination.

Total solids is, as the name indicates, the amount of solid matter in water, whether in solution or mechanically mixed.

While no hard and fast standards can at present be laid down in judging of the fitness of water for domestic purposes, we are guided in general by the following rules, based on Wanklyn's Standards, which are more or less elastic, according to circumstances and environmental survey of the source of the water.

Unless water contains more than 40 grains per gallon of total solids, no exception need be taken to the solids as such.

Five or ten grains of chlorine per gallon are not an absolute bar to the use of the water, but only a reason for suspicion under certain circumstances.

If a water yields no albuminoid ammonia, it may be passed as organically pure, despite much free ammonia and chlorine. If, indeed, a water yield 0.02 or less than 0.05 per million, then the free ammonia becomes a factor in the calculation, and a water should be regarded with a great deal of suspicion when such is the case.

Free ammonia being absent or present in very small quantities, a water should not be condemned unless the albuminoid ammonia reaches something like 0.10 parts per million. Albuminoid ammonia above 0.10 parts per million is a very serious thing, and when it reaches 0.15 parts per million the water is regarded as being positively unfit for domestic use.

Taking into consideration the fact that water analysis is an exceedingly difficult part of chemical work, and from the fact that the interpretation of results may mean so much, or so little, and that the effects of contaminated water on the human system are, at the present time, such open questions, though the evidence seems convincing, it is manifest that the analyst must be very guarded and if he err at all it should be on the side of safety.

Water Samples.

Container. A bottle of not less than one quart capacity is to be used, preferably one with a glass stopper. If there is no glass stopper, the bottle must be fitted with a new cork.

Samples of Water Analysed in 1909.

Water.	Total Solids	Chlorine	Free Ammonia.	Albuminoid Ammonia.
	Grains per gallon.	Grains per gallon	Parts per million.	Parts per million.
1. Well water	65.5	9.2	.306	.246
2. River water	20.3	.6	.003	.021
3. Well water	60.3	.036	3.600	.210
4. Creek river	41.0	....	trace	.02
5. River water	44.0	12.600	.240	.227
6. River water below sewage plant.	38.0	5.400	.80	.493
7. Well water	25.0	7.380	.053	.036
8. River water	75.6	7.600	.146	.480
9. River water, at outlet of sewage system	40.0	6.500	.180	.760
10. River quarter mile down stream from sewage plant	18.66	1.100	.022	.080
11. Well water	24.82	5.000	.004	.003
12. Well water	15.99	3.000	.013	.003
13. Spring water	17.99	2.200	.030	074
14. Spring water	57.9	3.200	.046	.050
15. Well water	23.13	.040	050	.030
16. Spring water	.....	325.5	29.320	.300
17. Well water	25.5	.5	traces	.0002
18. City water	19 57	.05	none	.03
19. Lake water	7.9	trace	.052	.02
20. Well near house	21.28	trace	.066	033
21. Well near barn	19.4	.4	.029	.001
22. Well near outhouses	87.2	4.2	.780	.378

Preparation. The bottle must be thoroughly cleaned, all foreign substances removed, and scalded out with boiling hot water and then allowed to drain until cool.

Taking of Sample. If the sample is to be taken from a well, the water must be pumped out for about five minutes, or long enough to empty all pump connections before the sample is taken; if from a tap, the water must be allowed to run to waste for about ten minutes, or long enough to empty all local laterals, before sampling. Water standing in the pipes in a house is under very favorable conditions for the multiplication of bacteria. If, therefore, the precaution of running off the water be not taken, a very erroneous conclusion as to the number of bacteria present may be drawn. If the sample is to be taken from a lake or stream, it must be taken some distance from the shore, the sampling vessel being plunged a foot and a half below the surface, to avoid the surface scum. Samples are not to be taken immediately after a storm.

From wherever the sample is taken, the bottle must be rinsed out several times with the water to be analyzed. The bottle must not be filled quite full, a small space must be left for the expansion of the water. Cork, and tie a piece of cloth over the neck to keep the cork in place. Do not use sealing wax.

It is not necessary to comment on every analysis, for an examination of the table will pretty clearly indicate the quality of the sample. There are a few samples, however, to which attention may be specially directed.

Sample No. 8 was taken from a river near sewage plant—water greatly contaminated.

Sample No. 1 was taken from a new well, yet the water is very bad.

Sample No. 16 was taken from a spring. The water is badly contaminated.

Sample No. 22 was taken from a well near outhouses. The water is bad, and the well has since been filled in.

Samples Nos. 17, 18 and 19 are excellent in every respect.

It may be here stated that clear, cold water, is not necessarily pure. Great care should, therefore, be taken to keep the wells, springs, and other sources of supply clean, paying particular attention to both animal and vegetable contamination.

Do not invite pollution by locating a well near a cesspool or barnyard.

Undoubtedly the best water for drinking is a moderately soft spring water, in which the possibility of pollution is out of the question. Unfortunately, however, it is very seldom that such water is available in sufficient quantities to supply large towns. Many spring waters are so hard that, while suitable for drinking, they are totally unfit for many manufacturing processes, for steam boilers, and for washing and culinary purposes.

The question has often been asked why a sample of water taken from one point in a city service is more contaminated than from another, both coming from the same source. This question is answered in the main by the fact that in most city systems there are so-called "blind ends" to the mains and which are very seldom flushed; consequently, there collects at points large amounts of sediment, organic and otherwise, which is churned up there, and a sample taken from near this end through a service pipe will necessarily be more contaminated than one taken farther away.

SAMPLES OF MISCELLANEOUS MATERIALS ANALYSED DURING THE YEAR.

Sample.	Moisture.	Nitrogen.	Insoluble residue.	Oxides of iron and aluminum.	Lime (CaO).	Potash (K_2O).	Phosphoric acid (P_2O_5).
No. 1. Ashes, Simcoe, Ont.	.57		41.14	14.10	25.35	3.93	1.89
No. 2. Ashes, Lindsay, Ont.					38.44	2.22	1.12
No. 3. Ashes					27.12	1.29	1.52
No. 4. Garbage ash, Port Dalhousie		.24				1.31	1.66
No. 5. Ashes, Stamford	27.37		25.98		24.09	1.86	1.78
No. 6. Ashes, Stamford					38.00	1.33	1.17
No. 7. Garbage ash, Toronto					8.57	2.57	3.57
No. 8. Ashes, Jordan Harbor	3.52				32.28	4.55	2.57
No. 9. Garbage ash, Toronto				5.31	8.12	1.27	1.65
No. 10. Wood ashes	5.26				36.45	5.14	1.32
No. 11. Hard coal ashes				3.68	12.48	trace	1.10
No. 1. Fertilizer, Winona		3.18				3.62	12.60
No. 2. Bone Phosphate, Grimsby							22.58
No. 3. Fertilizer, Wallaceburg	20.25	1.06				2.27	.05
No. 4. Bone Phosphate, Niagara District							25.15
No. 5. Bone Meal, Guelph							31.56
No. 6. Potassium Sulphate, Toronto						45.15	
No. 7. Ground Caplin, Newfoundland		6.66					
No. 8. Ground Kelp, Newfoundland		1.58					

WOOD ASHES.

From the above figures it will be seen that wood ashes are an important fertilizer, and particularly so as a supplier of potash, which exists in a soluble form and is, therefore, readily available to plants. The amount of potash varies, it will be seen, from about 1.29 to as high as 5.14 per cent. They also contain a fair amount of phosphoric acid, and are, of course, very rich in lime, and therefore make a good fertilizer to apply to acid soils. Farmers would do well to apply their wood ashes to their own land rather than selling them to buyers from the United States, as is being largely done at present.

A number of samples of garbage ash have also been examined. In addition to supplying potash and phosphoric acid, they also contain some nitrogen.

ROAD MATERIALS.

A number of samples of limestone rock and sand have been examined to determine their suitability for road construction. A material for road construction should not contain a large amount of clay, as it is then apt to disintegrate and break up more rapidly. The amount of phosphoric acid (P_2O_5) should not much exceed 1 per cent., and it should not consume more oxygen than 0.3 per cent., that is to say, oxidizable matter should not be present in large amount.

Of the samples analysed, No. 2 would appear to be the best material for road construction.

ANALYSIS OF ROAD MATERIALS.

Sample.	Insol. matter.	Iron and aluminum oxides.	Lime (CaO).	Magnesia (MgO).	Organic matter.	Phosphoric acid (P_2O_5).
No. 1. Limestone	5.49	2.29	31.31	15.17		
No. 2. "	.03	1.11	34.40	20.30		
No. 3. "	3.19	3.05	39.95	18.94		
No. 4. "	4.70	3.50				
No. 5. "	2.05	5.50				
No. 6. "	3.22					
	Clay.		Sand (S_1O_2).			
No. 7. Sand	2.25	4.14	50.50		1.24	
No. 8. "	13.56	6.38	56.92		2.17	
No. 9. "	3.03	2.61	84.32		1 15	

THE RELATION OF GEOLOGY TO AGRICULTURE.

A scientific study of soils, a study of their productive capacity, and of their requirements, cannot be carried on satisfactorily without a practical working knowledge of geology, that is, a knowledge of the composition and richness of the rock strata that lies beneath the soil and a classification of rocks into natural orders, or deposits. All Experiment Stations are now agreed that the question of soil investigations must be carried on from four standpoints, chemical, physical, geological, and botanical.

The cause of the diversity of soils is due to the difference in the underlying rock. If the rocks in two districts differ, the soils of the same are likely to differ also, and in a like degree. All soils, however, do not partake of the nature of the rock beneath them. In Ontario, for instance, the great variations have resulted from the work of glaciers, during the Great Ice Age.

The changes in agricultural character, however, and the capabilities of a soil are very closely related to the changes in the geological strata which form its surface. Though here and there there are natural soils that are buried by transported materials, yet the political economist may, nevertheless, safely estimate the general agricultural capabilities of the resources of a country by a study of its geological structure, the capitalist judge in what part he is likely to meet with a profitable investment, and of more importance to us, the practical farmer in what locality he may expect to find land that will best reward his labors, that will admit of the kind of culture to which he is most accustomed, or by the application of better methods will manifest the greater agricultural improvement.

In conclusion, let me thank you for having secured the appointment of Mr. A. E. Slater to this department, and to express my appreciation of the valuable service he has rendered.

Respectfully submitted,

W. P. GAMBLE.

PART VIII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College.

SIR,—I have the honour to submit my report for the year 1908-1909.

CLASS ROOM.

First Year. To this year I gave a course of lectures on Veterinary Anatomy, briefly, but somewhat comprehensively, considering the skeleton, ligaments, muscles, tendons and joints; the digestive, respiratory, urinary and generative systems; the circulatory and absorbent systems; the nervous systems; the skin, eye, ear, and foot.

I also gave a course of lectures on Veterinary Materia Medica, considering the source, properties, actions, uses and doses of the various drugs and remedies that are used for the prevention and cure of the ordinary diseases to which farm stock is subject.

In addition to the above I gave a series of lectures on the construction of horse stables, as regards site, material, drainage and ventilation; the kinds, size and arrangements of stalls; the general care of horses as regards feeding, watering, grooming, etc.; the care of harness and rigs, etc. I also gave a course of lectures and demonstrations on the characteristics of the different breeds and classes of horses, using for such purposes the horses of the institution, my own horses, and some that I borrowed.

Second Year. To this class I gave a course of lectures on Veterinary Medicine and Surgery, speaking of and illustrating, when possible, the causes, symptoms and treatment, both preventive and curative, of the ordinary diseases of farm stock.

I also gave a course of lectures on Veterinary Obstetrics, treating of the phenomena of conception, gestation and parturition. We considered the diseases of both dam and offspring incident to, and dependent upon, the parturient state and of such diseases as are liable to occur to either until the offspring has reached the age at which it can live without the aid of the dam. In addition I gave a course of lectures on judging horses, and a series of practical demonstrations on educating colts, handling horses, securing horses for the performance of minor operations which the average stock-owner should be able to perform; the different methods of administering medicines, etc., etc.

Third and Fourth Years. To these classes I gave some further instructions in judging horses, using the animals at our command, and visiting some breeders' and importers' studs.

Special Dairy Class. To this class I gave a short course of lectures on the causes, symptoms and treatment, both preventive and curative, of the ordinary diseases of dairy cattle.

Short Course in Stock Judging. This course was well attended and apparently highly appreciated by the class. As usual, a very large percentage of the horses used was supplied by the neighboring breeders, importers and dealers, and I take

this opportunity of publicly thanking Messrs. Sorby, A. McCannell, W. McCannell, Baker Bros., Palmer Bros., Tovell, Dr. Short, and others, for their kindness in not only allowing us the use of their horses, but either coming with them or sending grooms.

Diseases in Stock.

Horses. We had several cases of the ordinary diseases in horses, as colic, scratches, lymphangitis, lameness from different causes, constipation, influenza, strangles, etc., and all of which yielded to treatment. We had two fatal cases of acute indigestion, and also lost a colt from irregular strangles.

Cattle. We had several cases of the common diseases, as impaction of the rumen, fardel bound, mammitis, parturient apoplexy, difficult parturition, retention of the placenta, etc., all of which recovered. We had a fatal case of metritis, and one of fardel bound, and also lost a heifer during parturition.

Sheep. We lost one ewe from disease of the liver and one from rupture of the womb, and one from septic metritis.

Swine. We had little trouble with the swine, other than with new-born animals.

Respectfully submitted,

J. H. REED

PART IX.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College:

SIR,—I beg leave to submit my nineteenth annual report of the Dairy department of the College.

The work of the department may be conveniently grouped under three divisions: Teaching, Commercial Creamery, and Experimental.

TEACHING.

The Teaching branch consists of two lines of work, viz., that given to the regular College students and that for special courses in dairying.

To the first year is given a course of lectures and practical work relating to the Farm Dairy. In the second year the lectures and practical work relate to co-operative dairying. The students who specialize in dairying during their final year are given advanced lecture work and a laboratory course of experiments relating to cheesemaking, separators, buttermaking and milk-testing.

There are three short courses given in dairying each year, chief of which is one of three months to factory cheese and buttermakers and to farmers' sons and daughters. There are usually about twenty-five students from the Macdonald Institute who take the farm dairy work in this course in addition to the regular short course students. At the close of the three months' course, one-week courses are given for Dairy Instructors and for those desiring special help in milk and cream testing. The attendance at the short course in dairying was seventy-one.

A course of lectures was also given to the two Teachers' Training Classes this year.

O. A. C. CREAMERY.

In order to insure a regular and sufficient supply of milk and cream for practical training of dairy students and for experimental purposes we established last year a commercial creamery in the Dairy Department. One of my assistants, Mr. Stratton, has been given full charge of this part of the work. His report for the year is included. We now have a sufficient and fairly uniform supply of raw material. This has been of material help to us in both our teaching and experimental branches. Formerly, we have had a great deal of trouble in securing milk and cream as the College is not located in a dairying, but in a beef-raising section. However, we are glad to report that we have been able to demonstrate to the farmers about Guelph that *dairying pays*. You will see from Mr. Stratton's report, that the sum received for manufacturing butter aids considerably in meeting the expenses of the department. Milk used for cheesemaking and for the purpose of furnishing cream to the College and Macdonald Hall is purchased outright from the farmers at the average price per pound of fat paid each month to creamery patrons, plus twenty cents per 100 lbs. milk in lieu of the skim-milk. This arrangement appears to be a satisfactory one. After the cheese are required no longer for educational or experimental purposes they are sold, usually at regular market prices.

The cream is sold at 20 cents per quart for 22 per cent. cream, and the skim-milk is sold to the Farm at 20 cents per 100 lbs. Following is Mr. Stratton's report:

Prof. DEAN,—I beg leave to submit the following summary of the business done by the Ontario Agricultural College Creamery for the year ending November 30th, 1909:

Month.	Lbs. Fat Received	Lbs. Fat used in Butter-making	Lbs. Fat sold in Cream	Lbs. Butter made.	Total Sales of Butter and Cream	Per cent. Overrun	Average Selling Price per lb. Butter	Net Price per lb. Fat paid to Patrons
					$ c.		c.	c.
December, 1908	5,997.54	5,891.67	105.87	7,110	2,239.10	20.6	31	33
January, 1909..	5,025.58	4,875.99	149.59	5,736	1,819.13	17.6	30.76	32
February.....	5,243.32	5,058.67	184.65	5,846	1,738.67	15.5	28.64	29.3
March.....	6,929.70	6,713.18	216.52	8,204	2,300.07	22.0	27.11	29.2
April.....	7,660.66	7,434.54	226.12	8,865	2,400.43	19.2	26.82	27.3
May..... ..	10,344.67	10,085.57	259.10	11,942	3,054.58	18.4	24.87	25.5
June	14,465.48	14,220.39	245.09	16,891	3,930.48	18.7	22.76	23
July.	12,741.91	12,741.91	.....	15,134	3,632.57	18.7	24.00	24.5
August.....	12,019.31	12,019.31	.....	14,458	3,520.41	20.2	24.35	25.3
September	9,882.03	9,882.03	.....	11,768	2,958.23	19	25.13	26
October	7,883.16	7,883.16	.....	9,175	2,523.06	16.5	27.5	28
November .	7,551.61	7,551.61	.....	8,905	2,583.97	17.9	29	30.2
Totals and Averages.	105,744.97	104,358.03	1,386.94	124,034	32,700.70	18.8	26	27

Respectfully submitted,

R. W. STRATTON.

EXPERIMENTAL WORK.

During that part of the year (May to September) when we have no students the men and equipment are engaged in experimental work, details of which are submitted.

Two quite important lines of investigation are not reported on, to which a reference will be in order. For two years Mr. Taylor, our Instructor in Milk-testing, has been conducting a series of investigations comparing the testing of patrons' cream at each delivery with composite sampling. The results have been somewhat conflicting and we have thought it advisable to withhold the results until we have more data. Many creamery experts are advising the testing of cream at each delivery, and discarding the use of the composite method of cream sampling. In our own creamery we follow the plan of testing composite samples monthly. Whether or not this is best we are not prepared to say at present. If it were not for the extra labor involved in daily or individual delivery testing, we should certainly advise this method. Aliquot or proportionate sampling compared with the ounce dipper plan was tested, together with various preservatives, and weighing 18 grams of cream into the Babcock test bottle instead of measuring 18 c.c. There did not appear to be any advantage in aliquot sampling as compared with taking a uniform quantity for composite samples of cream. With the cream scales as ordinarily found in creameries it is a question whether the average man will obtain any more accurate results by weighing than he will by measuring.

The other line of dairy work, which is practically new in Ontario, is the making of "soft" and fancy cheese.

During the month of February we engaged Mr. F. G. Rice, a graduate of the Midland Dairy School, England, to give instruction to the dairy classes on this phase of dairying. After the School term was over we entered into an arrangement with him to continue the work on a commercial scale in order to test the Canadian market for these cheese.

We agreed to furnish Mr. Rice with a room and most of the utensils required. He bought the raw material and did the work, reaping whatever profit there might be in the business. In this way we ran practically no risk, and it gave us an opportunity to test the advisability of going into this branch of dairying. The results have been fairly satisfactory with "Stilton," "Camembert," and "Double Cream" cheese. The "Gervais" do not seem to be quite so popular. The chief trouble is in preventing the soft cheese spoiling during hot weather. Owing to the large amount of moisture which these cheese contain they tend to spoil very quickly in summer. Where a steady market can be obtained the profits are more than double what could be made in the usual way from hard cheese.

I am indebted to my assistants, Messrs. Stratton, Ralph, Taylor, and Wood, to Miss Sparrow, Stenographer, to the Instructors of the Dairy School, to the Western Ontario Cheese Instructors, and to the heads of several departments of the College and their assistants for help and co-operation during the year. The Chemical, Bacteriological and Animal Husbandry Departments have co-operated with us in the various lines of work. We desire to express our appreciation of the courtesies extended.

SUMMARY OF MANUFACTURING ACCOUNT, DECEMBER 1, 1908, TO NOVEMBER 30, 1909.

Amount of milk received for making cheese	291,494 lbs
Milk received to be made into butter or sold as cream or skim milk	167,274 "
Amount of cream received	354,337 "
Cheese manufactured	26,572 "
Butter manufactured	124,034 "

Receipts.	$ c.	Payments.	$ c.
Milk and cream	977 16	Hauling	2,330 21
Cheese and butter	35,208 38	Milk	4,400 47
Manufacturing butter	4,023 35	Patrons	33,005 06

In February and March 2,495 lbs. cheese-room milk was used for making soft cheese.

CHEESE AND BUTTER DIPLOMAS.

More interest than usual has been manifested during the past season regarding Diplomas for Cheese and Butter making. This is doubtless due, in part at least, to the recent legislation which requires that all head cheese and butter makers in the Province must have a diploma from a Dairy School or possess a permit from the Minister of Agriculture before they will be allowed to have charge of a factory after January 1st, 1911.

The following have made application for diplomas in 1909. Their names will come before the Dairy School Staff in 1910, when, if reports are favorable, diplomas will be granted:

Name.	Address.	Diplomas.
Andress, A. L.	Indian River, Ont.	Cheese.
Barber, A. E.	Cumberland, Ont.	"
Brown, J. L.	Ingersoll, Ont.	"
Brown, Wm.	Ridgetown, Ont.	Butter.
Clark, W. J.	Bieber, Cal., U.S.A.	Cheese.
Clubb, John R.	Brigden, Ont.	Butter.
Easton, J. L.	Dresden, Ont.	"
Goodhand, I. C.	Corbett, Ont.	"
Herries, G.	Lakeview, Ont.	Cheese.
Neilsen, Geo.	Qu'Appelle, Sask.	Butter.
Pressey, R. A.	Kerwood, Ont.	Cheese.
Waddell, J. A.	Kerwood, Ont.	Butter.
Wilson, J. E.	Keyser, Ont.	Cheese and butter.

Official Cow-Testing.

There has been considerable activity manifested among breeders of dairy cattle in the way of Official Testing during the year. During December 1st, 1907, to December 1st, 1908, there were supervised by us 85 seven-day, and 5 thirty-day tests, a total of 90. From December 1st, 1908, to December 1st, 1909, we have supervised 134 seven-day tests, and nine thirty-day tests, making a total of 143 for the year. All of the cows tested were Holsteins, and all in the Province of Ontario, except one in Quebec. The Superintendent of the Dairy School at Kingston took direct charge of the tests for us in Eastern Ontario.

Mr. Wood, of the Dairy staff, had direct supervision of as many tests as possible during the year, but we employed a number of others in addition. All expenses, save postage and clerical work, is borne by the owners of the cows tested. We certify to the results and forward them to the Secretary of the Holstein Association at St. George, Ont., or to the Superintendent of the American Association for the American Herd Book.

The following is the list of breeders for whom tests were conducted in 1909:

Name and Address.	No. of cows.
Seven day tests.	
Brown, W. W., Lyn.	4
Caughell, David, Yarmouth Centre.	6
Dent, T. H., Woodstock	1
Dunkin, T. L., Norwich	3
Dunn, Andrew, Ingersoll	12
Ede, P. D., Oxford Centre	3
Flatt, D. C. & Son, Millgrove	5
Foster, A. D., Bloomfield	4
Gilroy, G. A., Glen Buell	3
Goodison, Thos., Manhard	1
Griffin, F. G., Burgessville	3
Haley, M. L., Springford	14
Hallman, A. C., Breslau	1
Hamly, W. E., Rockford	3
Hartley, Thos., Downsview	4
Laidlaw, E. & Sons, Aylmer	4
McDonald, H., Bloomfield	1
McQueen, T. W., Tillsonburg	2
Mallory, B., Frankford	2
Manhard, G. H., Manhard	7
Pallett, Geo. W., Summerville	5
Pearce, C. J., Ostrander	1

Name and Address.	No of cows.
Seven day tests.—Cont'd.	
Pettit, F. E., Burgessville	1
Purtel, E. B., Bloomfield	1
Rice, Geo., Tillsonburg	9
Richardson, J. W., Caledonia	7
Rivers, Walburn, Foldens	4
Schell, W. S., Woodstock	9
Simmons, W. H., New Durham	3
Smith, E. A. & Son, Millgrove	2
Smith & Dyment, Dundas	1
Salley, P. J., Lachine Rapids, Que.	1
Stewart, J. W., Lyn	3
Teeple, A. H., Curries	2
Thompson, W. E., Woodstock	2
Total, seven day tests	134
Thirty day tests.	
Brown, W. W., Lyn	4
Richardson, J. W., Caledonia	4
Stewart, J. W., Lyn	1
Total, thirty day tests	9

Milk and Cream Samples Tested.

As usual, we have tested a large number of samples of milk, skim-milk and cream during the year, the total being 264.

One special case is worth mentioning. A farmer sent a sample of cream and skim-milk from his cream separator, to be tested, saying that he had suspected for some time the machine was not working well. The cream tested 19 per cent. fat and the skim-milk two per cent. We wrote advising not to use the separator until it was put in order as it was simply wasting milk-fat and that much better results in creaming could be obtained by setting the milk in pans or deep cans set in cold water.

About a month later this man sent us two samples of skim-milk and one of cream from the same machine, which had now been put in good repair. The results were .04 and .08 per cent. fat in the skim-milk samples and 35 per cent. fat in the cream. This was quite satisfactory, but in the meantime he had no doubt lost a good many pounds of milk fat and butter.

Cream Preservatives; Temperature for Holding Composite Samples; Testing Once vs. Twice Per Month.

Kind of Preservative.	Method of sampling.	Temperature.	Percentage of fat in sample.		Remarks on samples.
			18 grams in B. bottle.	18 c.c. in B. bottle.	
Corrosive sublimate (1 part) ..... Bi-chromate potash (3 parts)	Uniform quantity with ounce dipper.	60 to 70° F.	24	23.5	Sample in good condition.
Corrosive sublimate (1 part) ..... Bi-chromate potash (3 parts)	Uniform quantity with ounce dipper.	about 40° F.	23 5	24.	" "
		80° F. to 85° F.	22.5	23.	Some mould.
Tested twice in month ..		60° F. to 70° F.	23.8 av. of two tests.	23.7 av. of two tests.	Good condition.
Corrosive sublimate (1 part) ..... Bi-chromate potash (3 parts)	aliquot sampling. ½ c.c. per lb. cream.	60 to 70° F.	23.5	24.	" "
Corrosive sublimate (1 part)	" "	40° F.	24	23.5	" "
Bi-chromate potash (3 parts)	" "	60° to 70° F.	23.7 av. of two tests.	23.7 av. of two tests.	" "
Tested twice in month..	" "	80° to 85° F.	22.	22.5	" "
Corrosive sublimate (1 part) ..... Bi-chromate potash (7 parts)	" "	60° to 70° F.	23.5	23.5	" "
	" "	40° F.	23.5	23.5	Composite sample good.
Formalin, 1 c.c. per pint sample	" "	60° to 70° F.	29.5	26.5	Fat in Babcock bottle burned.
Formalin.....	" "	40° F.	24.5	23.5	Readings not satisfactory.
Gillett's Lye	" "	60° to 70° F.	23.5	23.	Lumps of curd in sample.
Gillett's Lye	" "	40° F.	23.5	23.	Readings very clear, best of any.

During the month of May four different kinds of preservatives for composite cream sampling were tested, viz., bichloride of mercury (corrosive sublimate) one part, and bi-chromate of potash three parts; same, mixed one part of corrosive sublimate and seven parts bi-chromate of potash; formalin and Gillett's Lye. All four of these were compared in samples kept at ordinary room temperature, and in similar samples kept in cold-storage at a temperature of about 40° F. The first one was also tested in composite samples kept moderately warm near a steam pipe. Comparisons were made by testing composite samples every two weeks with similar samples tested at the end of one month.

There was used of the sublimate-chromate preservative about what would lie on a five cent piece for each sample where the 1 to 7 mixture was used, and a little less of the 1 to 3 mixture. One c.c. of formalin, or about twenty-one drops, were placed in the composite bottle for a preservative, while of the Gillett's Lye, a piece about the size of a grain of corn was added to each sample at the beginning of the test.

Conclusions.

1. Of the various preservatives tested for composite cream samples, a mixture of one part bi-chloride of mercury (corrosive sublimate) and three parts of potassium bi-chromate (bi-chromate of potash) used in the proportion of a little less than what will lie on a five cent piece for preserving a pint cream sample for one month, has given the best all-round results.

The formalin preserves the samples in good condition but there are difficulties in the testing of samples where this is used. There appears to be a precipitate of curdy matter which if read as fat make the readings altogether too high—in these tests about five per cent. too great.

2. Composite cream samples kept in cold storage at a temperature of about 40 degrees F., were in the best condition and point to the fact that creamerymen might utilize their refrigerators as a place for keeping composite samples, with profit. Samples kept in a warm place are inclined to mould and to give results too low. Why the tests should be lower from composite samples kept in a warm place is not easily explained, unless it is due to the absorption of moisture, although the bottles were kept tightly corked, except when samples were being taken and at the time of testing for fat.

3. There did not appear to be any advantage in testing twice a month, as compared with testing once a month as indicated by these experiments.

4. Aliquot, or proportionate cream sampling, gave results similar to those obtained by taking uniform quantity (about one fluid ounce) from each delivery, although there was considerable variation in both weight of cream and percentage of fat in the deliveries—35 to 68½ lbs., cream testing from 18.5 to 29 per cent. fat.

Effect of Culture (Starter) and Pasteurization in Buttermaking.

Kind of cream.	% acid in cream.		Temp. of cream.		% fat in butter-milk.	Average flavor.		Average total.	
	Raw.	Ripe.	Delivered.	Churned.		1st score (50).	2nd score (50).	1st (100).	2nd (100).
Raw	.512	.575	68°F.	51°F.	.155	42	37.25	91.75	87.25
Raw +10% culture	.516	.606	68°F.	52°F.	.150	43	39.33	92.30	89.30
Pasteurized	.515	.487	68°F.	51°F.	.395	43	39.5	93.	89.5
Pasteurized +10% culture	.515	.555	68°F.	51.5°F	.357	42.5	39.5	92.	89.5

Four tests were made on August 13, 14, 18 and 19 on the effects of adding ten per cent. culture to raw and pasteurized cream. The cream as delivered to our creamery was divided into four lots: One was churned raw; one lot of raw cream had ten per cent. culture added; another lot of similar cream was pasteurized and churned without culture and the fourth lot was pasteurized, having ten per cent. of culture added. In all four cases the cream was held overnight in the vat and churned the following morning after delivery.

Conclusions.

1. The buttermilk from the pasteurized lots contained a higher percentage of fat than did the raw cream lots. These results agree with those obtained in other experiments, indicating a much greater loss of fat in the buttermilk where sour cream is pasteurized.

2. There was not so much difference in the quality of the butter when fresh, but the raw cream having ten per cent. culture, and the pasteurized lots, held their flavor better when scored at the end of two or three months. The addition of a pure culture (starter) to raw cream as ordinarily delivered to creameries will no doubt improve the flavor of the butter, and in these experiments the results were practically the same as from pasteurization, with the advantage of less fat lost in the buttermilk. However, we do not think that the use of a culture, or "starter," in cream will altogether take the place of pasteurization, but may be recommended where pasteurization is not practicable.

Effect of Cream Acidity on Loss of Fat in Buttermaking When Pasteurizing.

In order to study the effect of acidity in cream on the loss of fat sustained in the buttermilk through pasteurization, the records from fifty-six churnings during the months from April to August are summarized according to the percentage of acid contained in the cream at the time of delivery and pasteurization.

The main points are indicated in the following table:

1. Lots of cream containing less than .35% acid— 9 experiments.
2. " " .35% to .4% acid—7 experiments.
3. " " .4 to .45% " — 7 "
4. " " .45 to .5% " —11 "
5. " " .5% acid or over —22 "

The main points are indicated in the following table.

Per cent. acid in cream.				Per cent. fat in			
When pasteurized.		When churned.		Cream.		Buttermilk.	
Range.	Average.	Range.	Average.	Range.	Average.	Range.	Average.
.22 to .34	.304	.45 to .52	.477	26.5 to 30	27.6	.08 to .27	.133
.37 to .4	.387	.44 to .62	.495	25.5 to 28	26.6	.08 to .6	.20
.42 to .45	.430	.43 to .53	.470	27. to 28.5	27.5	.13 to .41	.232
.46 to .5	.473	47 to .59	.515	26. to 29.5	27.2	.08 to .8	.335
.51 to .57	.535	.47 to .6	.545	25. to 29.	26.7	.13 to 1.0	.522

The striking point about the foregoing table is the increased loss of fat in the buttermilk, as the percentage of acid in the cream at the time of pasteurization increased.

When the cream averaged from .3 to slightly less than .4 per cent. of acid, at the time of pasteurization the buttermilk did not test over .2 per cent. fat, which is usually regarded as "fairly exhaustive." As the acid in the cream increased above .4 there was an increase in the percentage of fat in the buttermilk, until when the cream at pasteurization had slightly over one-half of one per cent. acid, the percentage of fat in the buttermilk in individual churnings was from .8 to as high as one per cent., averaging over one-half of one per cent. from the twenty-two churnings recorded.

The practical lesson to be learned, is the importance of having cream as sweet as possible at the time of pasteurization, and that cream heated to 180 to 185 degrees when sour (containing .5 per cent. acid or more) means an extra loss of about one-half pound of butter per 100 lbs. buttermilk.

Cream can be delivered to our creameries practically sweet, if it be cooled and kept cold by the patrons immediately after separating and all the time until it reaches the creamery; and if delivery be often enough, say at least three times a week, to insure the cream not being too old or kept on the farm for too long a time.

(Whether or not it will *pay* to pasteurize sour cream we have discussed elsewhere.)

Pasteurization of Sour Cream at 120, 140, 160 and 180 Degrees vs. Raw Cream for Buttermaking.

During the months of June, July and August, four lots of sour cream were pasteurized at 120 degrees F., eight lots at 140 degrees F., eight lots at 160 degrees F., eight lots at 180 degrees F., and four lots were churned raw. The cream was that delivered in the usual way to our creamery, ranging in acidity from .42 to .57 per cent. when delivered to us. The temperature of this cream ranged from 65 to 76 degrees F., when unloaded from the drivers' cans. After thorough mixing in a large vat the cream was divided into four lots, one of which was either churned raw or heated to 120 degrees, while the other three lots were heated to 140 degrees, 160 degrees and 180 degrees respectively. From three to seven per cent. culture (starter) was added to each lot, except in one churning of raw cream where no culture was added, and the cream allowed to remain in the vat overnight. It was churned the following day. The percentage of fat in the cream ranged from 24 to 29.5, and averaged about 27 per cent. at the time of churning. The acidity at the time of churning varied from .49 to .65, averaging about .5 per cent. for the pasteurized lots and .6 for those churned raw. The time required for churning each lot varied from 16 to 64 minutes, averaging 27.5 minutes for the lots pasteurized at 120 degrees; 24.1 minutes for the 140 degrees; 23.7 minutes for the 160 degrees; 22.6 for those pasteurized at 180 degrees, and forty minutes for the raw cream lots. The temperature of the buttermilk when churning was completed, varied from 54 degrees to 60 degrees, averaging 58.75 degrees for the lots heated to 120 degrees; 57.3 degrees for the 140 degree lots; 57.2 degrees for the 160 and 180 degrees lots, and 57.7 degrees for the lots churned raw.

The loss of fat in the buttermilk and scores of butter may be conveniently grouped in a table.

Table Showing Loss of Fat in Buttermilk and Scores of Butter from Churning Cream Pasteurized at Different Temperatures, and Raw Cream.

Kind of Cream.	Loss of fat in buttermilk.		Average of Scores.			
	Range %	Average %	Flavor.		Total.	
			1st. (50)	2nd. (100)	1st. (50)	2nd. (100)
Pasteurized at 120°F.....	.27 to 0.9	.567	44.25	38.75	93.12	87.75
Pasteurized at 140°F.....	.16 to 1.2	.698	44.75	39.25	93.75	88.50
Pasteurized at 160°F.....	.23 to 1.0	.695	44.70	39.12	93.37	88.10
Pasteurized at 180°F.....	.22 to 0.8	.586	44.87	39.25	93.56	88.00
Raw cream	.16 to .29	.210	44.25	38 50	92.25	87.50

Two lots of the cream pasteurized at 180 degrees F., on June 30th and July 7th were divided, one part being kept in an ordinary cream vat over night and the other placed in cans, which were set in the cold storage over night. Both were churned at 48 degrees F. the following day. Both the lots set in cold storage had a low fat content in the buttermilk, viz., .25 and .17 per cent., averaging .21, or the same as the raw cream lots. It looked as if cooling were the remedy for the high loss of fat in the buttermilk from pasteurizing sour cream, but on August 20th, when a lot was cooled to a low temperature and churned at 50 degrees F., there was .8 per cent. fat in the buttermilk. On August 27th, churning at 51 degrees produced a buttermilk testing .8 per cent. fat, so that it would appear as if cooling to a low temperature is not a solution of the difficulty. Further study may throw some light on the question. It appears as if the heating of the sour cream coagulates the curd, which encloses the fat globules in such a way that they are not liberated by the process of churning.

Conclusions.

1. The pasteurization of sour cream caused an excessive loss of fat in the buttermilk as compared with the loss in churning similar lots of raw or unpasteurized cream. A range of temperature for pasteurizing from 120 to 180 degrees F. had about the same effect on fat lost in the buttermilk, the average loss at 120 degrees being about the same as at 180 degrees, while temperatures of 140 degrees and 160 degrees seemed to give slightly greater losses.

2. There was not much difference in the quality of the butter from the various lots when fresh, what difference there was being in favour of pasteurization at 180 degrees F. The keeping quality of the butter was improved by pasteurization of the cream at from 140 to 180 degrees F., there being very little improvement by heating the cream to 120 degrees F.

3. Where pasteurization is followed, we recommend having the cream as sweet as possible and adopting a temperature of 180 to 185 degrees F. The heating of sour cream to this temperature causes an extra loss of fat in the buttermilk, but this will, in all probability, be compensated for by an improved quality of butter—especially an improved keeping quality, which is of most importance in butter to be placed in cold storage for future use, or for shipment to distant markets.

Does the Pasteurization of Sour Cream Pay?

Since the year 1895 the Dairy department of the College has followed the plan of pasteurizing either the whole milk before, or the cream after separating. We were led to adopt this plan after a careful study of Danish methods of butter-making in that year. Many Ontario creamery men have adopted the plan, then discarded it, or have followed it in but half-hearted manner. Most of these men have concluded that it does not pay. The extra cost of heating, cooling and labor, together with the heavy loss of fat in the buttermilk where sour cream is pasteurized, make it too expensive, so these men say. It is somewhat difficult to determine the extra cost of making butter by pasteurizing as compared with the ordinary methods, but it has been estimated at one-tenth of a cent per pound of butter.

In order to obtain some commercial data on the question of extra loss of fat in the buttermilk by pasteurizing, we kept exact records of 48 of our regular churnings where the cream was pasteurized during the seven months of April to October. During this time, thirteen churnings were recorded where the cream was not pasteurized. The cream in both cases was that delivered in the usual way by patrons living from one to ten miles from the College Creamery. Some cream is delivered by patrons direct to the creamery, but most of it is collected by drivers two or three times a week in the usual way of conducting a cream-gathering creamery. In our case the cream is collected in large cans.

The following table gives the chief data on this work:

	Pasteurized Cream.	Raw Cream.
Number of experiments	48	13
Average per cent. acidity in raw Cream	.487	.485
Average per cent. acidity in ripe Cream	.525	.566
Per cent. fat in Cream	25.5 to 29.5	24 to 29
Average temperature for Churning	53.7°F.	52.4°F.
Average minutes for Churning	26.4	43.0
Average per cent. fat in Buttermilk	.477	.160
Average score in flavor:		
1st scores (50)	44.37	42.92
2nd scores (50)	39.10	37.76
Average total score:		
1st scores (100)	92.84	91.61
2nd scores (100)	88.08	87.15

The foregoing results indicate:

1. The pasteurized cream churned in less time than did the raw cream.

2. The loss of fat in the buttermilk was considerably greater by pasteurization as compared with churning raw cream, amounting in our creamery to about 330 lbs. fat during seven months, where the make was 88,233 lbs. butter. This extra loss of fat, at 25 cents per pound, and the extra expense for pasteurization would amount in round numbers to $150. The usual premium quoted by dealers for pasteurized butter is from one-half to one cent a pound. In our case, we receive, as a rule, about one cent a pound above average creamery prices. At one-half cent a pound the extra value of our butter during seven months was nearly $450. This leaves a clear profit over value of extra fat lost in the buttermilk and cost of pasteurizing of about $300. At a cent a pound premium the profit would be about $750.

3. The scores of the butter show an improved flavor and better general quality as a result of pasteurization.

In answer to the question, "Does pasteurization pay?" we may say, that in our case it does pay.

Hand Printing of Butter vs. Machine Printing.

In recent years there has been a large growth in the pound print butter trade for local markets. Formerly, consumers were content to purchase butter packed in crocks or tubs and cut out in pieces as required, either by the shop-keeper or the housekeeper. Now, this is largely done away with and nearly all the best shops do a print butter trade almost exclusively. The pound package wrapped in parchment paper is so neat and convenient that nearly everyone prefers to purchase their butter in this form. In our own case, practically all our make is sold in the form of pound prints. A few years ago we packed a large share of our butter in boxes during the summer. A great many creameries do a "print trade" almost entirely. Quite a few dealers put in a supply of butter in boxes or tubs during June and July when butter is plentiful and lower in price, then print this during the winter when butter is scarce and dear. All this has led to the invention of machines for printing butter, in order to save labor of hand printing, more particularly where butter is printed from boxes that have been in cold storage and are more or less firm in body, making the butter difficult to print by means of a hand printer.

We have tried several of these machines with more or less satisfactory results. All are constructed on similar general principles, viz., the use of horizontal and vertical wires set in a frame to cut butter to the desired weight of one pound, and in the shape of an oblong or "brick" print.

The earlier machines were intended to print butter directly from the churn while in a more or less soft condition. Those we have tried were mostly failures.

In most of the latest machines the fresh butter is packed into cube-shaped boxes holding about ninety pounds. These boxes are then set in the cold-storage until the butter becomes firm, when it is cut into blocks or prints with wire attachments. This arrangement is quite satisfactory where the creameryman has a cold-storage convenient and more particularly when he is compelled to make several churnings in the same churn in one day, as many creamery buttermakers are compelled to do. The butter, providing there are a sufficient number of boxes on hand, can be quickly packed from the churn and set in a cool place until the rush of work is over for the day, or until the following morning. The butter is then brought out and quickly printed. For the best results, one man is needed to make the prints and two to wrap them in parchment paper.

As a result of some experiments conducted during the past season we arrived at the following conclusions:

1. The number of pound prints made from a churning were about the same whether printed by hand or machine, there being a slight difference in favor of the hand printing.

2. Owing to the fact that our cold storage is located about fifty yards from the creamery, the time required to take the butter to the storage, return it to the creamery, wash the boxes, etc., was greater than the saving of time in printing with the machine as compared with printing by hand, where two men did the work in both cases. Under our conditions there was no gain in time by using the machine, although the machine-made prints were more uniform and neater in appearance. It is altogether likely that creamery men, under average conditions would find the machine printer an advantage in their work, where a large print trade is carried on and where the cold-storage is located convenient to the churning-room.

Casein and Fat in the Milk of Nine Cows, Belonging to Three Different Breeds, During One Year—Nov. 16, 1908, to Nov. 15, 1909.

Last year we gave a preliminary report on the work done with reference to casein and fat in cows' milk during 199 days with each of three cows representing three breeds of dairy cattle. This work has been continued during the past year with the same nine cows as were used during the preliminary test. The nine cows selected were as nearly representative of their breeds as we could obtain from the herd. One Holstein (No. 76) and one Jersey (No. 131) did not drop a calf during the year, but we did not consider it advisable to substitute others in their places, as the object of the experiment is to study the casein and fat, more particularly the casein, in individual cow's milk for a series of years. The work is being continued with the same cows for another year.

The milk from each cow was weighed morning and evening once a week for this experiment and samples were taken for fat and casein determinations. The fat was determined by the Babcock and the casein by the Hart short methods.

The following tables give the records for each cow by months during the year, and a summary for each cow and for each breed, showing the number of days' milking, pounds of milk given, and also pounds and percentages of fat and casein in the milk.

	Days Milking.	Milk Lbs.	Fat Lbs.	Casein Lbs.
No. 76. Holstein, age 9, Freshened February 7th, 1908.				
November, 1908	15	540	19.18	12.16
December, 1908	31	1,071	38.63	25.46
January, 1909	31	1,066	40.89	25.65
February, "	28	896	34.52	22.97
March, "	31	975	37.51	24.61
April, "	30	918	36.58	24.15
May, "	31	841	34.40	21.98
June, "	30	690	24.60	17.72
July, "	31	551	20.52	13.86
August, "	31	317	13.14	8.78
September, "	30	250	9.09	6.68
October "	31	205	8.26	5.49
November "	15	97	4.26	2.56
Totals	365	8,417	321.58	212.07
Average %			3.82	2.51
No. 111. Holstein, age 4. Freshened August 22nd, 1908 and September 5th, 1909.				
November, 1908	15	422	14.58	8.86
December, "	31	855	29 02	19 03
January, 1909	31	814	26.86	18.29
February, "	28	721	23.76	16.21
March, "	31	578	21.31	13.89
April, "	30	638	22.43	16.19
May, "	31	452	16.78	11.97
June, "	12	84	3.36	2.60
September, "	25	1,387	43.56	32.43
October, "	31	1,829	60.73	38.07
November, "	15	877	29.81	19.28
Totals	280	8,657	292 20	196.82
Average %			3.37	2.27

	Days Milking.	Milk Lbs.	Fat Lbs.	Casein Lbs.
No. 128. HOLSTEIN, age 8. Freshened November 19th, 1908.				
November, 1908	11	462	14.78	10.62
December, "	31	1,322	43.32	29.05
January, 1909	31	1,395	45.49	28.35
February, "	28	1,078	37.44	23.70
March, "	31	1,178	42.11	27.33
April, "	30	1,096	40.00	25.78
May, "	31	1,076	38.74	25.38
June, "	30	980	34.32	23.20
July, "	31	829	30.08	19.89
August, "	31	361	14.94	10.28
Totals	285	9,777	341.22	223.58
Average %			3.49	2.28
No. 66. AYRSHIRE, age 9. Freshened April 8, 1909.				
November, 1908	15	269	11.97	7.39
December, 1908	31	444	20.38	13.03
January, 1909	31	331	15.64	11.45
February, "	15	107	5.75	3.39
April, "	22	792	29.69	19.
May, "	31	1,201	42.28	28.80
June, "	30	1,090	41.43	26.17
July, "	31	1,050	40.97	24.87
August, "	31	890	33.59	22.93
September, "	30	810	29.72	20.55
October, "	31	755	30.35	20.21
November, "	15	322	13.67	8.36
Totals	313	8,061	315.44	206 25
Average %			3.91	2.55
No. 136. AYRSHIRE, age 6. Freshened August 9th, 1908, and Aug. 25th, 1909.				
November, 1908	15	427	17.92	10.06
December, "	31	831	35.26	20.53
January, 1909	31	785	37.27	22.01
February, "	28	588	24.86	15.61
March, "	31	488	25.27	15.83
April, "	30	456	21.76	13.49
May, "	31	351	17.55	13.52
August, "	5	145	7.25	5.35
September, "	30	990	37.25	26.70
October, "	31	1,092	41.35	26.88
November, "	15	517	20.92	12.64
Totals	278	6,670	286.66	182.61
Average			4.29	2.73
No. 133. AYRSHIRE, age 5. Freshened October 10th, 1908, and October 24th, 1909.				
November, 1908	15	585	20.47	13.13
December, "	31	1,264	44.84	28.79
January, 1909	31	1,252	46.66	29.20
February, "	28	952	33.59	22.78
March, "	31	1,112	41.39	28.65
April, "	30	1,024	41.27	29.25
May, "	31	1,018	40.87	26.65
June, "	30	860	34.62	23.76
July, "	31	534	22.04	14.79
August, "	15	70	2.91	2.13
October "	7	231	7.85	6.93
November "	15	638	21.98	16.87
Total	295	9,540	358.49	242.93
Average %			3.75	2.54

	Milking Days.	Milk Lbs.	Fat Lbs.	Casein Lbs.
No. 131. JERSEY, age 8. Freshened October 9th, 1907.				
November, 1908	15	180	8.35	4.67
December, "	31	380	13.90	10.04
January, 1909	31	352	15.88	9.41
February, "	28	336	15.78	9.47
March, "	31	356	16.90	10.77
April, "	30	346	16.20	10.10
May, "	31	358	16.54	9.16
June, "	30	350	15.99	8.88
July, "	24	160	7.50	4.06
Total	251	2,818	127.04	76.56
Average %			4.50	2.71
No. 129. JERSEY, age 13. Freshened April 30th, 1909.				
November, 1908	15	158	8.44	4.28
December, "	31	342	18.34	9.34
January, 1909	31	341	19.54	10.94
February, "	28	280	15.33	9.38
March, "	16	104	5 91	3.56
May, "	31	852	41.39	22.04
June, "	30	1,000	51.01	25.33
July, "	31	991	51.20	24.78
August, "	31	850	41.51	22.44
September, "	30	640	29.86	18.59
October, "	31	501	23.95	14.02
November "	15	217	10.30	5.96
Totals	320	6,276	316.78	170.66
Average %			5.04	2.71
No. 123. JERSEY, age 5. Freshened Oct. 20th, 1908, and Oct. 9th, 1909.				
November, 1908	15	368	16 52	7.92
December, "	31	675	32.14	16.15
January, 1909	31	599	28.14	16 20
February, "	28	420	20.21	12.23
March, "	31	489	25.52	13.57
April, "	30	450	24.72	13.17
May, "	31	513	28.10	13.44
June, "	30	440	23.99	12.04
July, "	31	370	19.96	10.25
August "	31	165	8.79	4.92
October, "	21	539	24.07	12.56
November, "	15	397	17.67	8.91
Totals	325	5,425	269.83	141.36
Average			4.97	2.60

SUMMARY OF YEAR'S TESTS.

November 16th, 1908, to November 15th, 1909 (inclusive).

No. of Cow.	Days Milking.	Lbs. Milk.	Lbs. Fat.	Lbs. Casein.
HOLSTEINS:				
76	365	8,417	321.58	212.07
111	280	8,657	292.20	196.82
128	285	9,777	341.22	223.58
3 cows	930	26,851	955.00	632.47
Average %..	.....	....	3.55	2.35
AYRSHIRES:				
66	313	8,061	315.44	206.25
136	278	6,670	286.66	182.62
133	295	9,540	358.49	242.93
3 cows	886	24,271	960.59	631.80
Average %.	.....	.....	3.95	2.60
JERSEYS:				
131	251	2,818	127.04	76.56
129	320	6,276	316.78	170.66
123	325	5,425	269.83	141.36
3 cows	896	14,519	713.65	388.58
Average %.	.....	.....	4.91	2.67
9 cows	2,712	65,641	2,729.24	1,652.85
Average ...	301	7,293.4	4.15%	2.51%

The following points are brought out in the summary of results for the three breeds of dairy cattle:

1. The representatives of the three breeds each milked about the same number of days—930 days for the Holsteins, 896 for the Jerseys and 886 for the Ayrshires, or an average of 301 days per cow for the year.

2. The Holsteins produced most milk, 26,851 lbs., or an average of 8,950 lbs. per cow.

The Ayrshires were a close second with 24,271 lbs.—an average of 8,090 lbs. per cow.

The Jerseys averaged 4,839 lbs. milk per cow, but one of these had not freshened since October 9th, 1907. This cow will freshen the latter part of November, 1909, and ought to make a good showing next year.

The nine cows produced 65,641 lbs. milk, or an average of 7,293 lbs. per cow during the year.

3. The Ayrshires stand first in pounds of milk fat produced during the year, having a record of 960.59 lbs., or an average of 320.19 lbs. per cow. The average percentage of fat in their milk was 3.95.

The Holsteins produced 955 lbs. milk fat, with an average of 318.33 lbs. per cow and 3.55 per cent. in their milk.

The Jerseys produced 713.65 lbs. milk fat, having an average of 237.88 lbs. per cow, and 4.91 per cent. in their milk.

The nine cows produced in the year 2,729.24 lbs. milk fat. The milk contained an average of 4.15 per cent. fat.

4. The Holsteins and Ayrshires produced practically the same weight of milk casein—the one 632.47 lbs., and the other 631.8 lbs., or an average of 210.82 lbs. per cow for the Holsteins and 210.6 lbs. per cow for the Ayrshires. The Jerseys gave 388.58 lbs. casein, or an average of 129.52 lbs. per cow for the year.

The nine cows produced 1,652.85 lbs. milk casein in the year—an average of 183.65 lbs. per cow.

The average percentages of milk casein by breeds was Jerseys 2.67, Ayrshires 2.60, Holsteins 2.35, with an average for all nine cows of 2.51 per cent. for the year.

5. The relation of milk casein to milk fat by breeds for the year is:

Ayrshires.—For each pound of milk casein there was 1.52 lbs. milk fat.

Holsteins.—For each pound of milk casein there was 1.51 lbs. milk fat.

Jerseys.—For each pound of milk casein there was 1.83 lbs. milk fat.

For each pound of milk fat, there was milk casein as follows: Ayrshires, .65 lb.; Holsteins, .66 lb.; Jerseys, .54 lb.

6. In brief, the Holsteins produced most milk and milk casein. The Ayrshires produced most milk fat. The Jerseys gave milk containing the highest percentages of fat and casein. These results are similar to those obtained last year. The percentages of fat and casein were slightly higher for all the breeds this year as compared with last.

Variation in Percentages of Fat and Casein in the Milk of Nine Cows—Three Breeds of Dairy Cattle.

The table shows the extreme variations in the percentages of fat and casein in the milk tested from the individual cows of the three breeds. In the case of No. 136 (Ayrshire) where the extremely high tests of 9.4 per cent. fat and 4.6 per cent. casein are recorded, the cow was sick and gave but 8 lbs. milk that day (March 26th.) The following week (April 3rd) her fat test had dropped to about normal (4.9 per cent.) but her milk still contained a high percentage of casein—4.3 per cent. The following week the tests were 5.2 per cent. fat and 4.1 per cent. casein. The fourth week the percentages of fat and casein were respectively 4.4 and 3.3. After this time her milk tested high in casein, 3.7 to 4.1, until she went dry, May 30th. This cow freshened August 25th. Her first tests (August 29) after this were again high, 5 per cent. fat and 3.7 per cent. casein, but from September 12th to November 15th, her fat and casein tests were normal, ranging from 3.6 to 4.1 per cent. fat and 2.4 to 2.9 per cent. casein.

Most of the other high tests for fat and casein occurred when the cows were nearly dry and the low tests when fresh, although there are some exceptions to the rule. Generally speaking, high fat content and high casein tests are associated together but this is not always the case.

Table Showing Variation in Percentages of Fat and Casein in Milk.

No. and Breed of Cow.	Highest Percentages of		Lowest Percentages of	
	Fat.	Casein.	Fat.	Casein.
111. Holstein	4.3	3.1	3.0	1.9
128. "	6.3	4.7	3.1	2.0
76. "	5.8	3.8	3.5	2.2
136. Ayrshire	9.4	4.6	3.6	2.4
133. "	4.2	3.1	3.3	2.1
66. "	5.2	4.5	3.3	2.3
123. Jersey	5.7	3.8	4.4	2.1
131. "	5.0	3.2	4 2	2.4
129. "	5.9	3.6	4.1	2.3

EFFECT OF LACTATION PERIOD ON PERCENTAGES OF FAT AND CASEIN IN NINE COWS' MILK DURING ONE YEAR.

Herd No.	Breed.	Lactation	Average p.c. fat in milk by weeks.				Average p.c. casein by weeks.			
			1st.	Last.	31st.	Last 3.	1st.	Last.	1st 3.	Last 3.
111	Holstein	Intermittent	3.0	4.0	3.13	3.96	1.9	3.1	1.9	2.9
128	"	"	3.2	6.3	3.26	5.26	2.3	4.7	2.3	3.66
76	"	Continuous	3.5	4.4	3.56	4.36	2.2	2.6	2.3	2.6
136	Ayrshire	Intermittent	5.0	4.8	4.23	4.86	3.7	3.8	3.13	3.8
133	"	"	3.4	4.2	3.43	4.23	3.0	3.1	2.73	3.06
66	"	"	4.2	5.2	3.66	4.93	2.4	4.5	2.4	3.8
123	Jersey	"	4.4	5.0	4.46	5.26	2.4	3.8	2.33	3.36
131	"	Continuous	4.7	4.9	4.63	4.73	2.6	2.8	2.6	2.6
129	"	Intermittent	4.1	5.9	4.36	5.66	2.8	3.6	2.63	3.36
Averages			3.94	4.96	3.85	4.80	2.7	3.55	2.48	3.23

COMMENTS ON TABLE.

1. The foregoing table indicates an increase of practically one per cent. fat in the milk given by the nine cows during the last week of lactation as compared with the first week; and about the same difference, as the average for the last three weeks of lactation, compared with the first three weeks.

2. The average percentages of casein during the first and last weeks of the lactation period were respectively 2.7 and 3.55, showing an average increase of .85 per cent. in the casein during the last week. The averages of the first three and the last three weeks show a difference of .75 per cent. higher casein in the milk for the latter.

3. These results agree with those obtained last year with the same cows and indicate that the percentages of fat and casein in these cows' milk tend to increase with the period of lactation, but that the fat is higher than the casein in all stages. The average increase of the fat during the last three weeks, over the first three weeks, is about 25 per cent., while for the casein it is 30 per cent.

TABLE SHOWING PERCENTAGES OF CASEIN IN NINE COWS' MILK BY MONTHS.

Month.	No. 111. p. c. Casein.	No. 128. p. c. Casein.	No. 76. p. c. Casein.	No. 136. p. c. Casein.	No. 133. p. c. Casein.	No 66. p. c. Casein.	No. 123. p. c. Casein.	No. 131. p. c. Casein.	No. 129. p. c. Casein.	Average p. c. Casein.
January	2.23	2.03	2.3	2.8	2.33	3.46	2.7	2.66	3.20	2.63
February	2.25	2.20	2.57	2.65	2.40	3.90	2.92	2.82	3.35	2.78
March	2.45	2.32	2.52	3.27	2.57	.....	2.97	3.02	3.45	2.82
April	2.55	2.35	2.62	3.85	2.85	2.4	2.95	2.95	.....	2.81
May	2.68	2.36	2.62	3.84	2.62	2.4	2.62	2.56	2.60	2.70
June	3.1	2.33	2.56	.....	2.76	2.4	2.73	2.53	2.53	2.61
July	.....	2.40	2.50	.....	2.76	2.36	2.76	2.60	2.50	2.55
August	.....	3.24	2.82	3.7	3.06	2.60	3.12	.....	2.64	3.02
September	1.92	.....	2 73	2.7	.....	2.53	.....	.....	2.90	2.55
October	2 08	.....	2.70	2.46	3.0	2.68	2.33	.....	2.80	2.57
November	2.15	2.3	2.45	2.4	2.45	2.60	2.20	2.60	2.72	2.43
December	2.22	2.2	2.37	2.45	2.27	2.95	2.40	2.65	2.75	2.47

Comments on Table, Showing Percentages of Casein by Months.

1. Taking the averages by months we find that these nine cows produced milk containing the highest percentages of casein during August, March and April. Last year these cows produced the highest casein averages during May, June and July. So far, these results do not show any constant influence of season on the percentage of casein in the milk. It is probable that the period of lactation is a more important factor than the season of the year, with reference to effect upon the percentage of casein in cows' milk.

2. From June to October the cows were on pasture and receiving a small portion of bran and "Molac" in the stable. The remainder of the year they were chiefly in the stable receiving hay, corn silage, mangels and meal. There is nothing in the results to indicate that pasture or stable conditions have any effect on the percentage of casein in cow's milk, although it would be advisable to withhold judgment on this point until we have more data.

Fat and Casein in Individual Patron's Milk During Season, 1909.

We aimed to take one sample per week during the cheese season from the milk as delivered by about ten patrons. This is a continuation of the work done last year. A large amount of data has been accumulated on this point. We present a summary as follows:

Patron.	April.		May.		June.		July.		Sept.		Oct.		Season.	
	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
No. 1	3.63	2.3	3.92	2.42	3.84	2 46	3.52	2.12	3.86	2.46	4 5	2.77	3.88	2.42
" 2	3.53	2.16	3.67	2.42	3.46	2.28	3.25	2.15	3.58	2.36	3.77	2.46	3.54	2.30
" 3	3.76	2.16	4.12	2.55	3.66	2.38	3.77	2.2	4.14	2.64	4.86	2.86	4.05	2.46
" 4	4.16	2.43	3.87	2.37	3.60	2.36	3.47	2.47	4.22	2.84	4.56	2.96	3.98	2.57
" 5	3.56	2.46	3.52	2.52	3.62	2.44	3.65	2.12	3.46	2.40	3.53	2.3	3.55	2.37
" 6	3.53	2.36	3.67	2 35	3.68	2.34	3.85	2.27	4.38	2.88	4.26	2.93	3.89	2.52
" 7	4.46	2.30	4.07	2.50	3.78	2.46	3.82	2.17	4.20	2.80	4.46	2.78	4.08	2.45
" 8	3.60	2.33	3.47	2.37	3.30	2.38	3.35	2.17	3.82	2 58	4.86	2.93	3.73	2.46
" 9	....	.....	3.73	2 40	3.56	2.38	3.56	2.27	3.48	2.44	3.63	2 63	3.59	2.42
" 10	....	.....	....	.....	3.04	2.28	3.02	2.07	3.14	2.34	3.26	2.36	3.11	2.26
" 11	....	.....	....	.....	....	.....	3.37	2 07	....	.....	....	.....	3.37	2.07
Average of all	3.78	2.31	3.78	2.43	3.55	2.37	3.51	2.19	3.79	2.55	4.16	2.69	3.76	2.42

The results from testing individual patron's milk agree with the vat tests in finding the highest percentages of casein in the milk delivered during May (2.43), September (2.55) and October (2.69). Among nine patrons who sent milk during most of the season we find a variation in the average fat content of the milk of 3.11 to 4.08, and of casein from 2.26 to 2.57. The lowest average percentage of casein was found in the milk testing lowest in fat, but the highest average percentage of casein in the milk for the season (2.57) was that furnished by Patron No. 4, whose milk tested an average of 3.98 per cent. fat. Leaving out patrons Nos. 9, 10 and 11, who did not send milk for the entire season, we have 2.30 per cent. casein and 3.54 per cent. fat as the lowest averages; 2.57 per cent. for casein and 4.08 per cent. for fat as the highest averages, these being found in milk furnished by two different patrons.

Comparative Tests on the Influence of Casein in Milk on the Weight and Quality of Cheese.

Last year we reported on this test as follows: "The average difference in the percentage of casein in the milk of the two vats was but .14 per cent.—not sufficient, one might think, to make any appreciable difference in the yield and quality of the cheese, but the average yield of marketable cheese per 1,000 lbs. milk was 88.4 lbs. from the low casein milk and 94.5 lbs. from the high casein lots—a difference of 6.1 lbs."

While to some extent this difference is accounted for by the higher fat content (3.75 per cent.) in the higher casein milk, as compared with 3.51 per cent. fat in the milk of lower casein content, this difference in fat does not explain the whole increase.

During the season of 1909 fourteen experiments were made in which 8,232 lbs. milk, testing an average of 3.7 per cent. fat and 2.49 per cent. casein, were manufactured into cheese. The average percentage of fat in the whey was .232.

Similar lots of milk weighing 8,077 lbs., and testing 3.53 per cent. fat and 2.34 per cent. casein were made into cheese on the same days as were the lots of milk having a higher fat and casein content. The average percentage of fat in the whey was .21.

The average yield of cheese per 1,000 lbs. milk was 93.9 lbs. from the higher casein lots and 90.32 lbs. from the lower testing vats. There were required 10.63 lbs. milk to make a pound of cheese in the first case and 11.07 in the latter.

The moisture content of curds and cheese were very similar in both cases as shown in the table:

——	Dipping.	Green Cheese.	Ripe Cheese.
High Casein	50.6%	35.16%	34.8%
Low Casein	50.6%	35.23%	35.04%

The quality of the cheese was also quite similar in both lots as seen in the table of average scorings:

	Flavor.	Closeness.	Even Color.	Texture.	Total.
	(40)	(15)	(15)	(20)	(100)
High casein.	35.33	13.86	14.03	17.63	90.86
Low "	35.46	13.76	14.03	17.80	91.03

Conclusions: A slight increase in the percentage of casein in the milk for cheesemaking appears to have quite a marked effect on the yield of cheese. Up to the present we have not been able to get milk containing a higher percentage of casein without also containing an increased percentage of fat, hence, we are unable to ascertain the effects of increased casein alone in normal milks. Were we to add or remove cream to equalize the fat content it would destroy the natural

relation of fat to casein and make the test of little use in a study of the effect of a natural increase or decrease in the casein content of milk on the yield and quality of cheese. Last year an increase of .14 per cent. casein and .24 per cent. of fat in the milk caused an increased yield of over six pounds of cheese per 1,000 lbs. milk. This year an average increase of .15 per cent. casein and .17 per cent. fat in the milk gave an averaged increase yield of 3.58 lbs. cheese per 1,000 lbs. milk.

There appears to have been very little difference in the quality of the cheese as indicated by the relative scorings.

Casein is an important factor in determining the cheese-producing capacity of milk.

Vat Tests of Fat and Casein During Season.

During the seasons of 1908 and 1909 we tested the vats of milk furnished by about ten patrons to the cheese room, as often as possible for fat (Babcock method) and for casein (Hart method). The average percentages of fat and casein in the vats tested in 1908 were 3.67 and 2.39 respectively. In 1909 the averages were 3.6 and 2.5 respectively for fat and casein. The fat averaged practically the same as last year, while the casein is about one-tenth of one per cent. higher. The results by months are shown in the table:

Month	No. Tests Made.	Per cent. Fat in Milk.		Per cent Casein		Av. lbs. Cheese. Per lb.	
		Range.	Average	Range.	Average	Fat.	Casein.
1909.							
April	11	3.4 to 3.8	3.58	2.3 to 2.6	2.38	2.47	3.75
May	13	3.4 to 3.9	3.68	2.1 to 2.7	2.43	2.48	3.75
June	21	3.2 to 3.6	3.42	2 1 to 2.7	2.40	2.70	3.84
July	24	3.2 to 3.6	3.42	2.1 to 2.5	2.30	2.64	3 92
August	11	3.5 to 3.8	3.61	2.2 to 2.7	2.34	2.55	3.92
September	22	3.5 to 4.2	3.81	2.2 to 2.8	2.61	2.55	3.74
October	6	3.9 to 4.2	4.08	2.5 to 2.8	2.67	2.48	3.80

In 1908 the highest percentages of casein in the vats of milk in our cheese room were during the months of June, September and October. The results are similar for this year, except that the May milk is slightly higher than for the month of June. This is probably due to the higher average percentage of fat in the May milk. As a general rule, we find that milk testing high in fat tests higher in casein than does milk with a lower percentage of fat, although the increase in casein is not in exact ratio to the increase in fat.

Relation of Casein in Milk to Yield and Quality of Cheese by Months, 1909.

These experiments are a continuation of the work done last year. During the past season, April to October, we used 33,996 lbs. milk for the tests, which averaged 3.67 per cent. fat and 2.39 per cent. casein. The average percentage of fat in the whey was .225. The average pounds of cheese per pound of fat in the milk was

2.56; per pound of casein, 3.91. The average pounds of milk to make one pound of cheese was 10.64. There was made an average of 93.9 lbs. cheese per 1,000 lbs. milk. The average percentages of moisture in the curd at dipping, in the green, and in the ripe cheese were 49.67, 35.37, and 34.62 respectively. The cheese scored an average of 91.2 points out of 100. One experiment was made each week during the season except for the month of August, when but two tests were conducted—one at the beginning and one at the end of the month.

The chief points in the work may be summarized in the following table:

TABLE SHOWING RELATION OF FAT AND CASEIN TO YIELD OF CHEESE BY MONTHS.

——	April.	May.	June.	July.	Aug.	Sept.	Oct.
Lbs. milk used	3,569	5,959	6,241	5,474	2,836	6,184	3,733
Percentage fat in milk	3.6	3.73	3.53	3.41	3.6	3.8	4.1
Lbs. fat in milk	128.86	222.41	220.86	187.07	102.08	234.06	153.07
Average percentage casein	2.36	2.40	2.37	2.19	2.24	2.52	2.63
Lbs. casein in milk	84.38	144.40	147.97	119.85	63.78	156.24	98.39
Average percentage fat in whey	.24	.23	.19	.20	.22	.22	.26
Lbs. cheese made	316.38	548.19	606.44	496.56	256.13	595.75	375.25
Lbs. cheese per lb. fat in milk	2.45	2.46	2.74	2.65	2.50	2.54	2.45
Lbs. cheese per lb. casein in milk	3.74	3.79	4.09	4.14	4.01	3.81	3.81
Lbs. milk per lb. cheese	11.2	10.8	10.2	11.2	11.0	10.3	9.9
Lbs. cheese per 1,000 lbs. milk.	88.6	91.9	97.1	90.7	90.3	96.3	100.5

The foregoing table shows:

1. The highest average percentages of fat and casein were found in the milk during the months of September and October.

2. The greatest yield of cheese per pound of fat in the milk was in the month of June (2.74 lbs), and the least in April and October (2.45 lbs.).

3. The greatest yield of cheese per pound of casein in the milk was in July (4.14 lbs.), and the least in April (3.74 lbs.).

4. It required 11.2 lbs. milk to make a pound of cheese during April and July, while in October but 9.9 lbs. were required.

5. The greatest yield of cheese per 1,000 lbs. milk was in October (100½ lbs.), and the least in April (88.6 lbs.).

6. The percentage of fat in the whey was fairly uniform throughout the season at about .2.

7. Theoretically, fat and casein in the milk should govern the yield of cheese; practically, this is not always the case, as shown by the table in the month of June, where milk with comparatively low percentages of fat and casein produced a comparatively high yield of cheese, both relatively to fat and casein and absolutely per 1,000 lbs. milk.

EFFECT OF ACID AT DIPPING ON CURDS NOT STIRRED AND STIRRED SLIGHTLY.

In order to see what effect, if any, there might be from not stirring curds or stirring them slightly and having one vat dipped sweeter than the other, eight experiments were conducted in which 4,788 lbs. milk testing an average of 3.46 per cent. fat, were divided equally between two vats after thorough mixing in a larger vat. The vats were treated as nearly alike as possible, except that the A vats were dipped with an average of .172 per cent. of acid, while the B vats had .192 per cent. acid. The acidity at milling and salting were quite similar on both curds.

averaging about .8 per cent at milling and 1 per cent. at salting. Both lots showed about the same loss of fat in the whey, which tested .202 per cent. fat in the A lots and .204 in the B lots.

The percentages of moisture in the curds at dipping, in the green and ripe cheese were:

	Dipping.	Green cheese.	Ripe cheese
A	55.50	36.7	36.2
B	54.55	36.3	36.0

The A lots produced an average of 93.1 lbs. cheese per 1,000 lbs. milk. The B lots averaged 92.82 lbs. cheese per 1,000 lbs. milk. The A cheese scored 35.87 points in flavor and a total of 91.62; the B lots scored an average of 35.38 in flavor and 91 for total.

The results show a slightly increased yield of cheese and a little better quality of cheese by dipping the unstirred or slightly stirred curds with an average of .172 per cent. acid as compared with dipping at an average of .192 per cent. acidity. Further experiments are needed before definite conclusions may be drawn.

Stirring vs. not Stirring Curds at the Time of Dipping—Acid Same in both Vats.

This work is a continuation of that done in 1908. Fifteen experiments were made by using 8,753 lbs. milk testing an average of 3.53 per cent. fat in the A vats of which the curds were not stirred. An equal weight of similar milk was made into cheese in the B vats, the curds of which were stirred "dry" at the time of dipping. The percentages of fat in the whey were .203 and .206 respectively from the A and B vats.

The average percentages of acid and moisture in the curds at dipping and of moisture in the cheese were:

	Average % Acid at			Average % Moisture in		
	Dipping.	Milling.	Salting.	Curd.	Green Cheese.	Ripe Cheese.
A	.187	.805	1.03	55.64	36.32	35.92
B	.187	.746	.977	50.56	35.64	35.20

The average yield of cheese per 1,000 lbs. milk from the A lots not stirred was 93.7 lbs.; and from the B lots stirred "dry," 93.01 lbs. The average score of the cheese from the two lots was:

	Flavor.	Closeness.	Color.	Texture.	Total.
	(40)	(15)	(15)	(20)	(100)
A	35.46	14.06	14.03	17.80	91.36
B	35.60	13.86	14.	17.83	91.30

Last year the yield of cheese per 1,000 lbs. milk was increased .4 lb. by not stirring the curds at dipping. This year the increase was .7 lb. by not stirring. In both years there was little or no difference in the quality of the cheese by following the two methods.

Conclusion.

The results of two years' tests gave an increased yield of cheese of over one-half pound per 1,000 lbs. milk by not stirring the curds after or at the time of dipping and this with no deterioration in the quality of the cheese. Cheesemakers may try the method on a small scale and note results. The advantages are, less labor and a greater yield of cheese.

ONE VAT DIVIDED AT TIME OF DIPPING—(A) CURD NOT STIRRED, (B) STIRRED.

These experiments are a continuation of the work done last year. Thirteen experiments were conducted in which 19,525 lbs. milk testing an average of 3.71 per cent. fat were used. The whey tested an average of .215 per cent. fat. The milk was treated in the usual way up to "dipping" time, when the curds had an average of .185 per cent. acid. Each curd was now divided into two nearly equal parts, but not weighed, one of which (A) was not stirred, while the other (B) was stirred "dry" or until it contained about 50 per cent. of moisture.

The main results are shown in the table:

Per cent. acid at		Per cent moisture in			Lbs. ripe cheese.	Per cent. shrinkage.	Score.
Milling.	Salting.	Curd.	Green Cheese.	Ripe Cheese.			
(A) .772	1.01	57.47	36.3	35.6	900.02	3.33	91.1
(B) .72	.96	50.50	35.6	34.8	956.08	3.12	91.3

The results are similar to those obtained last year and indicate:

1. A slightly greater and more rapid development of acid on the curds not stirred.

2. The curds not stirred contained at dipping about seven per cent. more moisture than those stirred in the usual way.

3. The green and ripe cheese from the unstirred curds contained respectively .7 and .8 per cent. more moisture as compared with those stirred in the usual way. There was also slightly more shrinkage in the cheese from curds not stirred.

4. There was little difference in the quality of the cheese.

Conclusion.

The results of two years' experiments indicate clearly that there was little or no difference in the quality of the cheese where the curds were not stirred as compared with curds from the same vat of milk which were stirred in the usual way.

Moisture in Curd and Cheese—Samples from College Cheesery.

Between April 26th and July 23rd the moisture was determined (mostly in duplicate) in sixty-four samples of curd, same number of green cheese and fifty-six samples of ripe cheese from the cheese branch of the College Dairy department. The milk for this work was purchased from farmers in the vicinity of Guelph. The moisture determinations here reported were made in a high pressure steam oven from normal curds in connection with the experimental cheese work done during the season. The relation of moisture in curds and cheese to the quantity and quality of cheese made in the experiments will be discussed in connection with the details of the various lines of investigational work. At present, we shall merely give a summary of the work as it relates to the moisture found in normal curds and cheese at the College, together with a summary of the results from samples sent to us by the Western Ontario Cheese Instructors.

The average percentages of moisture in the College samples tested were:

Curd at dipping, 50.836; green cheese, 35.526; cheese one month old, 35.005.

The foregoing averages of thirty-eight samples do not include the results from those curds at dipping which were not stirred, but represent fairly well the average moisture content in the curd and cheese of the College dairy during the season of 1909.

Moisture in Curd and Cheese from Western Ontario Factories.

In addition to the moisture determinations made of curds and cheese produced at the College, we arranged for samples to be sent in by each of the Cheese Instructors in Western Ontario during the season of 1909. Owing to difficulty and delay in securing a proper mailing bottle and case for the samples it was about the middle of July before the work was fairly started, although Instructor McKay began sending samples so early as May 26th. The last samples were received September 23rd. From the six Instructors (Messrs. Burgess, Gracey, Green, Hart, McKay and Travis) we received 33 satisfactory samples of curd and 45 samples of green cheese. A few samples had apparently leaked during transit and these are not included in the result. The samples of curd were taken at the factory after dipping and when the cheesemaker had stirred them to that condition known as "dry." The green cheese samples were taken from these same curds after they had been pressed over night. The moisture was determined in a high pressure steam oven which was fully described, together with the method used for determining the moisture, in my report for last year (1908).

The following cheese factories in Western Ontario contributed samples of curd and cheese: Donegal, Harriston, Wallace, Fordwich, Maitland, Newry, Molesworth, Galabank, Dorchester, Keyser, Canboro, Bismark, Boston, Lynden, Fork's Road, Virtue, East and West Oxford, Culloden, Norwich Gore, Verschoyle, Kintore, North Oxford, Innerkip, Black Creek, Fullerton, Avonbank, Ballymote, Thamesford, Hickson, Innerkip, North Branch, Bennington, Springford, Walsh, Dunboyne and Summerville. (*Note.*—In a few cases we did not receive name of factory along with sample. Instructors are arranged alphabetically and name of factories in each group according to date of receiving sample. More than one sample was received from a few factories.)

The following table summarizes the percentages of moisture found in the samples from the six groups of factories:

Name of Instructor.	Percentage of Moisture in					
	Curd at Dipping.			Green Cheese.		
	Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
J. R. Burgess	44.4	40.4	41.920	35.0	32.8	33.571
A. E. Gracey	42.8	38.4	40.160	34.8	33.2	34.133
R. H. Green	41.2	40.0	40.800	34.4	32.8	33.533
E. N. Hart	44.2	42.0	43.200	34.80	32.0	33.383
Alex. McKay	44.4	39.2	41.075	36.4	33.2	34.493
Geo. Travis	43.6	40.0	41.520	35.2	33.6	34.280
Average of all			41.445			33.898

We consider the foregoing rather a remarkable showing of uniformity in moisture content for both curd and cheese. Out of thirty-three samples of curd sent in by the six Instructors, the extreme variations of individual samples are from 38.4 to 44.4, while the averages of the samples sent in by the Instructors vary only from 40.16 to 43.2. Among the cheese samples we have individual sample variations from 32 to 36.4, while the averages vary from but 33.383 to 34.493.

We should have liked samples of ripe cheese from these same curds, but did not find it practicable to obtain them.

Comparing the results of the moisture content in the thirty-eight samples of College curds and cheese with those found in thirty-three samples of curd from Western Ontario factories we find that the curds from the factories averaged 41.445 per cent. moisture at dipping, while our own averaged 50.836 or 9.391 per cent. higher. The forty-five samples of green cheese from the factories averaged 33.898 per cent. moisture, while the College green cheese averaged 35.005 per cent., or over one per cent. higher.

We have pointed out at various times that in our judgment cheesemakers go to more trouble than is necessary in stirring curds, and that they reduce the moisture content of their curds and cheese to a greater extent than is advisable in the making of fine Cheddar cheese. It is possible that in factories where the temperature of the ripening (curing) room runs above 70 degrees F. for any length of time, there might be some danger in having 35 to 36 per cent. of moisture in the green cheese, but in those factories where the temperature is fairly well under control, we believe that the moisture content could be increased in Western Ontario cheese by one or two per cent. with advantage. It would mean less pounds of milk to make a pound of cheese, thus making a better "average," and the cheese would suit the customer better, as no one cares for "dry," "bony" cheese. It would be no injustice to the consumer, because the moisture in the cheese is the natural water of milk, having dissolved in it sugar, mineral matter, and albuminoids, all of great food value.

We hope to continue this work during another season in order to obtain more data from a larger number of factories.

Moisture in Curd From One Vat Not Stirred.

Four experiments were made in which altogether 10,468 lbs. milk, testing an average of 3.38 per cent. fat were made into cheese with little or no stirring of the curd at the time of dipping. The weights of milk in the individual vats varied from 2,300 to 2,900 lbs. The percentage of fat in the whey averaged .2. The percentage of acidity at dipping, milling and salting averaged .195, .75 and .955 respectively. The yield of cheese averaged 90.3 lbs. per 1,000 lbs. milk. The average score of the cheese was 90.75 out of 100. The average percentage of moisture in the curd at dipping was 52.5; in the green and ripe cheese 35.5.

The results are similar to those of last year, indicating that good cheese may be made from good-sized vats of milk without the stirring of curds at the time of dipping which is usually considered necessary.

We are unable to explain why the green and ripe cheese should apparently contain the same percentages of moisture. In all our work the difference in moisture content of "green" and "ripe" cheese is seldom more than one-half of one per cent., yet the cheese usually shrink two or three per cent. in weight during one month. Is this shrinkage entirely due to loss of moisture or is it due partly to gases resulting from the ripening process? Or are methods of sampling and determining moisture in cheese faulty? At present we are unable to answer these questions.

Milk Solids Lost in Making Overripe Milk into Cheese.

This is the third year in which experiments have been conducted to ascertain the loss from allowing milk to become overripe or partly sour for cheesemaking. We have found considerable difficulty in conducting these experiments in a satisfactory manner. This year the lots made from overripe milk were chiefly manufactured on Mondays during hot weather, so as to have the conditions similar to those found at cheese factories. The normal lots were taken on the following day. In this way we aimed to have results comparable with what might be expected at cheeseries.

During the season, six experiments were made in which 13,122 lbs. of overripe milk were used. This milk tested an average of 3.53 per cent. fat, and 2.43 per cent. casein. The whey contained an average of .236 per cent. fat. The weight of milk varied from 1,900 to 2,800 lbs. for each test.

The normal lots of milk (7,744 lbs., total) averaged 3.49 per cent. fat, and 2.32 per cent. casein. The whey from these lots averaged .216 per cent. fat. The weight of milk for each experiment varied from 1,000 to 1,500 lbs.

The lots of overripe milk remained in the whey for an average of one hour and six minutes. The normal curds were in the whey two hours and forty-nine minutes. The average percentages of moisture in the curds at dipping, in the green and ripe cheese were:

——	Dipping.	Green Cheese.	Ripe Cheese.
Overripe milk	50.9	35	35
Normal milk	49.6	35	34.6

The overripe milk yielded an average of 90.5 lbs. ripe cheese per 1,000 lbs. milk, while the yield from the normal lots was 91.5 lbs. per 1,000 lbs. milk.

The yield of cheese per pound of fat and casein in the milk was 1.516 lbs. from the overripe lots and 1.57 from the normal.

The pounds of milk required to make a pound of cheese were 10.9 from normal milk and 11.04 from the overripe lots, although the latter were slightly richer in both fat and casein.

The quality of the cheese is indicated by the following average score:

——	Flavor. (40)	Closeness. (15)	Even Color. (15)	Texture. (20)	Total. (100)
Normal lots	35.83	13.66	14.25	17.70	91.41
Overripe lots	35.66	14.33	14.33	18.25	92.50

Conclusions.

1. Last year the normal milk lots produced an average of 2.7 lbs. cheese more per 1,000 lbs. milk than did similar lots of overripe milk. This year the increased yield of cheese was one pound per 1,000 lbs. milk from the normal as compared with overripe milk. The experiments of both years show a decided loss of cheese by allowing the milk to become overripe or partly sour. This loss at a factory receiving daily from 10,000 to 20,000 lbs. milk would amount to from about 10 to 20 lbs. cheese, worth from one to two dollars daily. There is great need that patrons understand the importance of delivering milk in a sweet condition at cheese factories.

2. So far as the quality of the cheese is concerned the results indicate that a skilful maker can make good cheese out of overripe milk, but with the average cheesemaker there is likely to be a poorer quality of cheese made from overripe milk.

Fine vs. Coarse Wire Curd Knives.

These tests are a continuation of the work done last year in which we reported that the curds cut with the coarser (3-8 inch) knife gave a greater yield of cheese and that it was difficult to account for this increased yield by using the knife with greater distance between the wires, unless it were due to an increased amount of moisture in the cheese.

During the season of 1909 thirteen experiments were made in which were used 14,334 lbs. milk testing an average of 3.57 per cent. fat. The whey from the curds cut with the 1-4 inch knife tested an average of .224 per cent. fat, and that from the 3-8 inch knife tested an average of .228.

The milk for each experiment was mixed in one vat, coloring and culture were added, then it was divided between two vats. Both vats of milk were cut once, after coagulation, with a 3-8 inch horizontal blade knife, then each was cut twice with one of the perpendicular wire knives.

The vats cut with the 1-4 inch wire knife gave an average yield of 92.5 lbs. of ripened cheese per 1,000 lbs. milk. Those cut with the 3-8 inch knife produced an average of 92.8 lbs. cheese per 1,000 lbs. milk—an average increase of .3 lb. cheese per 1,000 lbs. milk. Last year the 3-8 inch knife gave an average increase

of .4 lb. cheese per 1,000 lbs. milk. The shrinkage during one month was 2.96 per cent. from those cheese made by using the 1-4 inch knife and 2.95 per cent. from cheese where the curds were cut with the 3-8 inch knife.

PERCENTAGES OF MOISTURE AND SCORE OF CHEESE.

—	Percentage Moisture.			Total Score.
	Dipping.	Green Cheese.	Ripe Cheese.	
¼ inch knife.....	51.7	36.2	35.2	90.7
⅜ inch knife.....	53.4	36.35	35.8	90.2

Conclusions.

1. In both years the percentages of moisture in the ripened cheese by using the coarse horizontal knife (3-8 inch) was slightly greater.

2. In both years the yield of cheese by using the coarser knife was slightly greater.

3. There was very little difference in the quality of the cheese made by using these two kinds of knives for cutting the curd.

4. So far as these experiments indicate, they point to the advisability of using the coarser knife (3-8 inch) for ordinary curds. There may be an advantage in using the finer knife in special cases, such as when handling overripe milk, but considering yield and quality of cheese for regular factory work the results are in favor of using the coarser (3-8 inch) knife.

WHEY AND WHEY BUTTER EXPERIMENTS.

Last year we made a full report on the whey butter question so it will not be necessary to give more than brief details of the work done during the past year.

As in 1908, the Animal Husbandry Department co-operated with us in hog-feeding experiments. We furnished three kinds of whey for these tests, viz.:

Ordinary whey taken directly from the vat.

Whey from which the fat had been extracted with a cream separator but not pasteurized.

Ordinary whey pasteurized to a temperature of about 156 degrees F. (For results of these feeding tests, see Report of Prof. Animal Husbandry.)

Owing to the fact that practically all our whey was used for these feeding experiments, there was not sufficient for us to carry on churning tests satisfactorily after June 10th, when the feeding tests began.

During the latter part of April and early part of May, four churning trials were made by separating the whey from 5,554 lbs. milk, testing an average of 3.84 per cent. fat. There were about 5,000 lbs. whey from this milk, testing an average of .26 per cent. fat. The whey cream tested 30 per cent. fat. In three cases the cream was pasteurized, culture added and ripened, and in one case it was not pasteurized, but allowed to ripen naturally. The weight of butter made from the 5,000 lbs. whey was 12.05 lbs., or an average of 2.41 lbs. butter per 1,000 lbs. whey. Last

year we made an average of 2.675 lbs. butter per 1,000 lbs. whey. The average for the two years is practically 2 1-2 lbs. butter per 1,000 lbs. whey.

The table shows the quality of the butter as indicated by scorings when fresh, when one month, and when six months made:

Kind of Butter.		Flavor (50)	Grain (20)	Color (15)	Salt (10)	Package (5)	Total (100)
Pasteurized Whey Cream (3 lots).	Average 1st scores.....	44	18.2	13.6	9.5	5	90.4
	" 2nd " (1 month)....	43	18.2	14.1	10	5	90.4
	" 3rd " (6 months) ..	36.3	19	14.3	10	5	84.6
Not Pasteurized (1 lot).	1st score	40	18	14	10	5	87
	2nd " (1 month).....	38	18	14	10	5	85
	3rd " (6 months)	20	18	10	10	5	63

The results indicate very fair quality of the pasteurized lots of butter when made and show also very fair keeping quality—in fact equal to average creamery butter.

The lot made from unpasteurized cream and allowed to ripen naturally, was the poorest in quality and went off in flavor very badly at the end of six months. It would be almost impossible to sell this butter, after keeping six months in a refrigerator at a temperature of about 40 degrees F. It will be noticed that the "grain" and "color" of the pasteurized lots seemed to improve with keeping.

Conclusion.

Very fair butter can be made from the fat of whey and it possesses fairly good keeping quality when the cream is pasteurized. However, it is not likely to pay, except in large factories and when butter is dear in price.

All of which is respectfully submitted.

H. H. DEAN.

PART X.

THE PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit the following report upon the work of this department during the year ending November 30th, 1909.

Instruction. Aside from the instruction as outlined in the regular and short-course announcements, ten lectures on bacteria as related to agricultural science were delivered to the special Normal class last spring.

Publications and Special Lectures. During February, Bulletin 169 was published by the Department of Agriculture. This bulletin gives a resumé of work done at this College upon nitrogen accumulation by legumes, and includes morphological and cultural studies of the nitrogen-accumulating bacteria, as well as the results of the distribution of cultures of these bacteria for the inoculation of seed during the years 1905 to 1908 inclusive.

Two press bulletins were prepared, and several articles were contributed gratis to agricultural papers in Ontario and the United States.

A paper giving a resumé of results in seed inoculation by Canadian farmers during 1908 was read before the annual meeting of the Experimental Union in December. A paper on the "Bacterial Contamination of Milk" was presented before the Ontario Women's Institute convention for 1908. A paper on the "Keeping Quality of Butter" was prepared for the annual meeting of the Western Ontario Dairymen's Association at Brantford in January. An illustrated lecture on "Tuberculosis Among Farm Animals," was delivered in the Guelph City Hall during the Provincial Tuberculosis Exhibit in March. An address on "How Bacteria Help the Farmer" was delivered before the annual meeting of the North Waterloo Farmers' Institute in June.

Research. In collaboration with a representative from the United States' Department of Agriculture, some work was done during the summer upon the problem of so-called "White Diarrhœa" of chicks. While some valuable data were secured, yet no definite conclusions could be drawn as to the cause of this trouble among incubator chicks.

At the request of Mr. Frank Herns, Chief Dairy Instructor for Western Ontario, I spent some time in a study of the yeasts found in unpasteurized whey, with a view to giving cheesemakers further aid in avoiding "off" or undesirable flavors in cheese. This study is still in progress.

Further observations on tuberculosis in fowls have been made, as noted elsewhere in this report. Later on, if conditions seem to warrant, such data as we have collected will be prepared for publication in bulletin form.

Laboratory Analyses.

A summary of the work in the examination of material sent to us by farmers and others shows an increase in this work over last year.

Much of the material received consists of specimens from animals or plants showing indications of disease; of water and milk samples to be examined for potability or purity, etc. When such materials are received an examination is

made, the difficulty determined if possible, and a report is made to the sender, stating the cause of the trouble and the measures to be adopted in dealing with it. Much of the work is routine in its nature, though occasionally interesting, and valuable specimens for museum purposes and for class demonstration are received. All is of value to the farmer. A summary follows of such work for the year just closed, the materials, for convenience for reference, being arranged alphabetically.

Anthrax. In all, six cases of suspected anthrax have come to our notice. Three were samples of blood from cows, in two of which anthrax was demonstrated. Portions of spleen from two cows were examined and anthrax demonstrated in one. The blood and spleen from a horse gave negative findings. Two samples of water suspected of anthrax contamination were examined and the anthrax bacteria found in one sample.

Butter Paper. One sample of butter paper said to be mouldy was examined, and mould found thereon. Soaking of the butter paper in three per cent. formalin, and paraffining the boxes was recommended as a preventive.

Cheese. One sample of cheese, said to have a bitter flavor was examined, but no organism responsible for the condition was found in the sample.

Curd. One sample of slimy curd and one sample of curd said to have coagulated before adding rennet were received. The use of a pure lactic acid starter was recommended in each case.

Diphtheria. Four blood serum cultures from the human throat were examined for suspected diphtheria with negative results in all cases.

Ducklings. Four dead ducklings were examined and the cause of death diagnosed as intestinal coccidiosis.

Fowls. Aside from fowls affected with tuberculosis as described below, there were examined seventeen fowls. Of these a number died of various causes not of an infectious nature, and some on autopsy appeared perfectly normal, the senders of these evidently having suspected disease where it was not present.

Fruit. One sample of spoiled canned pears was sent by one of the commercial canneries of the Province. On opening the cans, the fruit had black specks over the top, appearing like particles of dirt. The trouble was caused by the use of too much flux in the solder.

Hog Cholera. We were called upon during the year to investigate three outbreaks of hog cholera.

Milk. In all, twenty samples of milk were submitted for examination and various conditions found. Two samples were from farmers who stated that the cream became "frothy" or "foamy" on attempting to churn it. In both samples, yeast was found to be the cause of the condition. Trouble of this kind can usually be overcome by especial care in having all milk utensils thoroughly scalded and in using for a time a pure lactic acid starter such as is used by creamery butter-makers.

Ropy Milk. One condition of milk that is sometimes troublesome is ropiness or sliminess in milk or cream.

During the past year we have had brought to us for investigation several bad cases of ropy milk. Each case was presented by a farmer whose farm was situated near a city in which he peddled the milk from twenty-five to thirty cattle, each having a good business, and each rapidly losing his customers, because the milk if kept a few hours would become viscid, slimy or ropy, apparently altogether unfit for use and disgusting to handle. This condition of the milk brought about a serious financial loss to these farmers, a loss which was increasing from day to day, and after trying their utmost to solve the problem they were almost in despair

of finding a remedy, when they brought the matter before our notice to see if we could do anything for them. We were able in each instance to find the cause and to suggest a simple remedy, which, if put into practice, would entirely do away with the mischief.

Although it is possible for this condition of milk to occur at any time of the year, the season when it appears to be most prevalent is during the summer or early autumn months.

Although it is possible for cattle suffering from inflamed udders or garget to produce slimy milk, we proved conclusively in each case investigated that it was not any disease in any of the cattle that was the cause of the ropy milk trouble. In fact, this kind of ropy milk is not caused by a disease-producing germ, but by one that lives in water, soil, ice or other materials, and is not at all dangerous from a health standpoint, either for animals or man. So that this kind of ropy milk is not caused by a diseased condition of the cow, nor will it cause any disease in man.

The germ that causes the trouble is known to bacteriologists as *bacillus lactis viscosus,* that is, the germ which makes milk viscid. It lives indefinitely and multiplies in water containing organic matter. Some districts are troubled with it and others are not. We may liken it to a bad weed which may be prevalent on one farm or throughout a whole neighbourhood, and other districts may not be troubled with it at all, until it spreads to them from the infected areas in one or more of the many ways that everybody knows weeds spread. The germ, though small—it has to be magnified a thousand times before it can be seen—has a comparatively thick, gelatinous covering when it grows in milk; and as one germ dropped into milk will increase into myriads of its kind in twenty-four hours, we can easily see how the milk becomes stringy or ropy; it is simply because millions of these germs with their sticky, slimy coverings have developed in the milk, until the milk is practically nothing but a mass of them.

At the farms at which investigations were carried on, the cattle on inspection appeared to be all right, and samples of their milk tested were proven to be free from the trouble. Samples of water from the wells, cisterns, and cooling vats proved these to be the sources of the trouble in every instance. In one case, the barnyard well proved to be badly infected, and from this well the cooling vats were filled, and they were badly infected. Just one drop of this water accidentally splashed into a can of milk would cause it to become ropy. If this water splashed on to the floor and then dried up, the dust on the floor would be infected with the troublesome bacteria, and if this dust blew into the milk the milk would turn ropy. If any of this water got on the milkman's hands, he would be liable to smear it on the cans when he was putting them into the vat or when he was putting on the can lids, and the result would be ropy milk. In many other ways it would be possible for a little of this water to get into the milk. Then if the cans, pails, and strainers were not thoroughly scalded after they had once had infected milk in them, the milk that was put into them afterwards would become ropy. As it takes from twelve to thirty-six hours for the ropiness to develop, the milk has usually left the milkman's or farmer's hands before it gets ropy, and he knows nothing of it until he hears from his customers about it next day.

Remedy for "Ropy" Milk. Such, then, is the nature of the trouble and its cause; now for the remedy. When once milk is infected, it cannot be prevented from becoming ropy unless it turns sour. The souring of the milk by the lactic acid germ will prevent the development of the ropy milk germ, and we have known farmers prefer to have their milk turn sour rather than have the reputation of being the retailers of ropy milk, and so they did not put their cans into the cool-

ing vats. The remedy for the trouble then is to prevent the germs from getting into the milk, and to prevent them from getting in we must know how they get in and where they come from. A simple way of ascertaining where they come from is to take a series of vessels, such as tumblers, cups, bottles, or jugs, thoroughly scald these and put into them some milk immediately after milking. Then into one of these put about a spoonful of water from the cooling vat, into another the same quantity from the well or cistern, into another a little dust from the stable or milk house floor, and so on, putting into one of these vessels of milk a little of the water or other material which may be suspected of being the source of infection. Then cover these over with a plate or saucer, or anything else that has been scalded, and put them away where they will not be disturbed for twenty-four hours or so. Then using a different spoon or fork for each one, test them for ropiness, and in this way one can find out where the germ is coming from. All cans, pails, and strainers should be *thoroughly* scalded or steamed before use each time. If the source of contamination be a well or cistern, the water from these should not be allowed to touch the cans, pails, etc.

The walls of the stables and milk house should be thoroughly disinfected with whitewash made by mixing water with unslaked lime to make a wash the consistency of thin cream, to which mixture is added commercial sulphuric acid, concentrated, in the proportion of one gallon of the acid to twenty gallons of the lime wash. This mixture should be made up in small lots and applied hot, as it is only in this condition that it is effective as a disinfectant. The milk house floors may be covered with the same mixture and afterward scrubbed with scalding water and a good washing powder.

See that *each* utensil is thoroughly cleansed and scalded. When one kettle or pail of water is used for scalding half a dozen or more cans, the water is no longer scalding hot after it reaches the second can even, and as it is poured into each can from the one before, it gets cooler and cooler, and has no effect upon the bacteria that may be present. Where a separate milk house is maintained, means should be provided for plenty of boiling water, or steam at the milk house, for thorough scalding is the keynote of success in getting rid and keeping rid of milk troubles.

Plant Diseases. (By Mr. D. H. Jones.) With one exception, *i.e.*, blight of apple and pear tree, bacterial plant diseases have not been very prevalent in the Province this year. The dryness of the season was largely, if not altogether responsible for this. One or two cases of black rot or wilt of cabbage caused by *Pseudomonas campestris,* and several samples of field and garden beans suffering from bean bacteriosis caused by *Pseudomonas phaseoli* have been forwarded to the department for examination. No cucumber wilt or soft rot of cabbage, cauliflower, turnip, carrot or bacterial wilt and rot of potato were brought before our notice, and not a single case of any one of these diseases occurred on the College property.

The bacterial blight of apple and pear trees, however, has been very severe in most of the pome fruit districts. Many pear trees were killed and a large percentage of the young growth on apple trees was withered and destroyed by this disease. Special attention was given to this disease during the summer, and the result of the investigations made has been submitted as an illustrated bulletin.

Plant Lice Responsible. *It was found that fifty per cent. of the total amount of twig blight that occurred on apple trees, and that practically all cases of twig blight that occurred after the blossoming season was over, were due to in-*

oculation of the disease germs into twigs, suckers, and water sprouts by aphids, principally Aphis mali and Schizoneura lanigera.

It is well known to orchard men that the aphid's favorite feeding place is on the water sprouts, suckers, and young twigs of the trees. It is here they find the tender bark which they can easily puncture to obtain the plant juice which is so plentiful there. Now it is the tender, juicy bark that supplies the ideal condition for rapid development of the blight germ. An aphid, when feeding, punctures the bark from which it draws the sap with its sucking tubes. Should the twig which it punctures have the blight, the sucking tube which is inserted in the bark will be contaminated with the blight germs, and so, when the aphid moves to another twig, it will carry the germs on its sucking tube, which on puncturing the fresh twig will inoculate it with the germs of the disease. We found this to be happening in practically all the orchards we visited during June, July, and early August. We found many young trees that had not yet borne a blossom and that were absolutely free from blight before the aphids came in June, to have after this date all their young shoots killed out by the gradual spread of the disease from the tips downward after they had been inoculated by aphids. We also found large numbers of suckers and water sprouts on the older trees develop the disease after the aphids visited them, and rapidly die. In many cases when the disease reached the base of the watersprout or sucker it entered the limb or trunk on which the shoot grew and there formed a canker, sometimes large and spreading, if the bark was juicy, and sometimes small. The bark immediately surrounding such canker is liable to harbor the disease germs through the winter, then in the spring, when the sap begins to run once more, the germs rapidly develop, spread farther through the bark, thus enlarging the canker, and often girdling the limb, which results in its death.

We found aphids to be the principal means of spreading the blight in apple tree nurseries. Wherever in nurseries the aphids were kept in check there was practically no blight, while in the nurseries in which the aphid was allowed to have its way there the blight flourished in all directions.

While aphids and "twig blight" are both common on the apple, neither are very prevalent on the pear. Blight, however, kills off many more pear trees than apple trees. How, then, is the blight carried to the pear trees? It is sometimes carried to the blossoms by bees and wasps and it is such inoculations that are responsible for most cases of "twig blight" in the pear. "Body blight," however, is more common than "twig blight" in the pear. This is the same disease working in the bark of the trunk and larger limbs. How do the germs get into this old bark? Sometimes they enter it at the base of the twigs which have been inoculated at the blossoms. We found, however, this season cases of direct inoculation into the bark of healthy trees made by the fruit-bark-boring beetle (*Scolytus rugulosus*). This is the same beetle that works in the bark of the peach and cherry, causing them to exude large quantities of a gum-like material. The pear does not exude this gummy material, and as the hole made by the beetle is very small, and is usually underneath a bud or spur it is not readily seen. This beetle bores in the bark and is more common on weak or diseased trees than on healthy ones. We found the beetles in the bark of blighted trees to be literally covered with blight germs, and we found the disease to be developing around the fresh punctures made by these beetles in the bark of healthy trees. *The fruit-bark-boring beetle, then, is one means of spreading the blight among pear trees.*

The pruning-knife, saw, chisel, shears, harrows, cultivators, and other tools used in the orchard, after coming in contact with a diseased tree, are potent

carriers of blight that could be clearly traced to this source of infection; and we proved in a number of experiments how easy it is for the disease to spread in this way. After using a knife and a saw on the diseased part of a tree and then on a healthy tree, niching the bark or cutting off branches, we found that in seventy-five per cent. of the experiments the healthy tree contracted the disease at the point cut.

Scraping healthy trees with diseased trees when removing the latter from the orchard is also a common method of inoculating healthy trees.

Eradication and Prevention of the Disease.

When once the disease enters a tree, whether it be in the fruit, twig, branch or trunk, there is no remedy for the affected part. The only measure to be adopted is to cut it out and burn it right away. To cut off an affected twig will save the branch on which it grows, and to cut off a diseased large branch will save the tree.

In cutting dead or diseased tissue from a tree, care must be taken to cut from six inches to a foot below the blighted area, as the germs always extend further than the visibly affected part.

The best time to cut out blight is the first time it is seen, as every case of active blight is a potent source of infection for innumerable other cases. However, it is not always practicable to locate every case of blight as it occurs. The best time for systematic action in an orchard is in late fall or early winter. At this time the diseased parts are more readily noticed than in late winter or early spring; and if precautions be taken to burn the material cut out, this will ensure the destruction of the beetles, aphids, and other insects harboring on and in it.

If an orchard be cleared of the blight during the winter, there will be no germs there for insects to get contaminated with in the following spring. Hence, as the bees and wasps go from flower to flower they will not infect the blossom. The blossoms not being inoculated, there will be no early twig blight; so that when the aphids come later in the season, there will be no source of infection for them. If, however, there should be affected trees in the neighbourhood of the orchard, which is usually the case, then the only way to keep the disease out of the orchard is to control the insects.

The aphids may be kept in check by spraying the trees when the buds are just beginning to swell, with home boiled lime-sulphur, preferably of the strength of 25 lbs. lime, 20 lbs. sulphur, to 40 gallons of water. This is to kill the eggs which may be seen on the twigs and smaller branches of the tree. To destroy the aphids in summer give them a thorough drenching with kerosene emulsion. In the fall observe if any aphids are present on the water sprouts, where they will be found, if there are any on the trees at all at this time of the year. If present, cut off the water sprouts and destroy them.

Several bad outbreaks of the fruit-bark-boring beetle in peach and cherry orchards have been traced to wood piles made from diseased and dead wood taken from the orchard. It is in such wood that the beetles winter over and in the spring they issue from it in large numbers and make their way usually to the orchard once more. This shows the necessity for burning dead and diseased wood taken from the orchard before spring.

We feel certain that if concerted action, such as indicated, be taken on the part of all fruit growers in any district, the disease may be wiped out of that district and be prevented from entering it any more.

Tuberculosis. A number of cases of tuberculosis in different species of animals have come to our notice.

In my report for last year special notice was made of tuberculosis in fowls. During the year just passed, more data have been collected showing the wide distribution of this disease in Ontario, and cases in seventeen hens and one turkey were examined in the laboratory.

We were called upon to examine seven carcasses of cattle for tuberculosis. Six of these were slaughtered subsequent to the tuberculin test, and the disease was found present in each case.

Observations were made on one case of tuberculosis in a dog.

An interesting case of tuberculosis in horses also came to our notice. During September we received a piece of peritoneum which we later learned was from a horse, and stained preparations from which gave the characteristic reaction for the organism of tuberculosis. Arrangements were made with the owner to apply the tuberculin test to the remainder of his horses, with the result that three out of eight tested gave typical reactions for tuberculosis. Two cows in the same stable also reacted to the test at the same time. The particular interest attached to these cases lies in the fact that tuberculosis in horses is considered very rare. So far as we have been able to determine from the literature available, less than fifty cases have been reported. In our cases, complete isolation of the reacting from the healthy animals, thorough disinfection and a retest in six months was recommended.

One case of tuberculosis in a hog was observed.

Aside from the foregoing review of the year's laboratory work, there were many cases of less particular interest, numbering a total of 161 cases, or an increase of 43 over the corresponding period for 1907-1908.

During the year we distributed ninety-eight lactic acid starters to cheese and buttermakers.

Legume Bacteria.

The distribution of cultures of nitrogen-accumulating bacteria for inoculating seeds of legumes was continued with the same good success that has attended the work of the department along this line in the years previous. Briefly, the results are as follows: A total of 2,017 cultures were sent to 1,227 farmers in the nine provinces of the Dominion and three foreign countries. 372 reports were received from farmers giving the results of their experiment, of which 56.7 per cent. stated that benefit had been derived from the use of the cultures.

We are preparing to send similar cultures during 1910. For the benefit of those desiring such cultures, I quote the following paragraph from my report for 1908:

"Cultures for inoculating seed will be sent during the coming season for seed of the following crops: Alfalfa, red clover, alsike clover, peas, beans, sweet peas, vetches. The laboratory prepares but one size package of culture, that being sufficient for 60 pounds of seed, and a nominal price of twenty-five cents is charged for each package to cover cost of preparation, postage, etc. Each kind of seed requires a different kind of culture. All applications should state the kind of seed on which the culture is to be used, the number of cultures desired, and as near as can be judged the date of seeding. Remittance may be in any convenient way and should be sent with application to S. F. Edwards, Ontario Agricultural College, Guelph, Canada."

A tabulated summary of the year's results follow:

CULTURES SENT, 1909.

	Alfalfa.	Red Clover.	Beans,	Alsike Clover.	Peas.	Sweet Peas.	Vetch.	No. of farmers receiving Cultures.
Ontario	1,205	346	10	34	62	11	2	1,022
Quebec	31	4	0	1	1	5	0	35
Nova Scotia	2	8	2	1	1	1	1	9
New Brunswick	62	4	0	3	1	0	0	17
P. E. Island	6	2	0	0	0	0	0	6
Manitoba	10	8	0	4	1	0	1	15
Saskatchewan	31	4	0	1	2	1	0	32
Alberta	27	4	2	3	6	0	0	31
British Columbia	29	33	3	4	6	3	4	51
United States	6	3	0	0	0	2	0	7
Mexico	1	1	5	0	5	0	0	1
New Zealand	1	0	0	0	0	0	0	1
Totals	1,411	417	22	51	85	23	8	1,227

Total number of cultures sent out during the year, 2,017.

RESULTS OF INOCULATION, 1909.

	Alfala.		Red Clover.		Alsike Clover.		Peas.		Beans.		Sweet Peas.	
	+	—	+	—	+	—	+	—	+	—	+	—
Ontario	130	98	35	34	1	2	5	5	....	....	3	1
British Columbia	2	2	4	1	1	.....	1	....	....	....	2	.....
Alberta	2	3	1	1	1	.....	....	....	....	....	.....	.....
Quebec	5	1	1	.....	1	.....	....	....	....	....	1	.....
P. E. Island	3	....	.....	.....	.....	.....	....	....	....	....	....	....
Saskatchewan	4	4	2	1	.....	.....	....	....	....	....	.....	.....
Manitoba	1	2	.....	2	.....	2	....	....	....	....	.....	.....
New Brunswick	1	2	2	....	2	.....	....	....	....	....	.....	.....
Total	148	112	45	39	6	4	6	5	....	....	6	1
	56.9%		53.5%		60%		54.5%				85.1%	

\+ Indicates benefit from the inoculation.
— Indicates no benefit from the inoculation.

In conclusion, I wish to acknowledge my indebtedness to the other members of the departmental staff for their earnest co-operation in all the work of the department, and to Miss Ruth Edwards, who assumed practical charge of the sending of the cultures for inoculating seed for three months during the spring.

Respectfully submitted,

S. F. EDWARDS.

PART XI.

THE PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the report of my department for 1909.

As in past years, my work divides itself roughly into four departments, viz., lectures in the College; direction of live stock experiments; superintendence of the farm; and outside work, comprising attendance at Farmers' Institutes, Short Courses, and many other lines of work with which my position at the College brings me into contact.

The lecture work in the College calls for no comment here, and the live stock experiments completed during the year will be found in another part of my report. I may say, however, that we have some very important work started regarding which I shall have nothing to say until a later date.

Since the appointment of a number of our graduates to positions in High Schools throughout the Province, there has been an active demand for the services of both Mr. Wade and myself to assist with short courses inaugurated by these young men in their districts. This line of work has grown to such an extent that it has become a more or less serious problem, and it is difficult to know just what will be the outcome. It is only natural that the services of some person from this institution should be desired by the people where these short courses are held, and their requests for help are insistent and hard to refuse. The result is that a very serious inroad is made upon our work at the College, and our own students miss quite a number of lectures in consequence. We have aimed to assist the agricultural representatives as far as lay in our power, for the reason that we think their work is important and should receive all the support we can possibly give it. It is nearing a time, however, when some arrangement will have to be made to prevent such serious interference with lectures in the College as has occurred in the past, and the problem is of sufficient importance to call for very serious consideration.

In connection with the Farm department, I would like to call attention to two very important needs of this department. The first of these is a horse stable suitable for accommodating at least a limited number of breeding stock. During the past few years we have tried to do a very little in the way of horse breeding, but we have reached the limit of our accommodation, and if this very important branch of Animal Husbandry is to be recognized at this institution, some sort of additional accommodation for horses will be absolutely necessary. I trust that the very reasonable demands of the horse breeders throughout the Province may receive recognition at this institution, which is supposed to work in the interests of all classes of stock breeders.

Another important requirement in connection with our animal husbandry work is a new dairy stable. The present dairy stable is merely a patched-up affair, which was made out of an old, tumble-down building nearly twenty years ago. It is entirely inadequate for our requirements and is unsanitary, there not being enough

space to admit of proper ventilation. An up-to-date dairy stable would be a great boon to the interests of dairying at this institution, and it would also be of much service as a model to dairy farmers who visit the College. It is not to the credit of the institution that its dairy herd should be kept in unsanitary surroundings.

There are other things required in connection with the proper handling of our live stock, but the two just mentioned seem absolutely imperative if our work is to be at all effective, and I trust the matter may receive favorable consideration from the Department of Agriculture.

THE DAIRY HERD.

Following is the record of the herd for the past year:

REPORT OF DAIRY HERD FROM DECEMBER 1ST, 1908, TO NOVEMBER 30TH, 1909.

Name.	Breed.	Age, Dec. 1, 1908.	Number of days milking.	Lbs. milk.	Average per cent. of fat in milk.	Lbs. of fat in milk.	Lbs. butter adding ⅛ to fat.	Value of fat at 25c. per lb.	Cost of feed.	Profit over cost of feed.
								$ c.	$ c.	$ c.
Boutsje	H	6	288	12,939	3.55	459.41	535.98	114 85	64 09	50 76
Lady Springwood 2nd	H	5	322	12,190	3.55	432.34	504.39	108 08	49 08	59 00
Marjorie Cornelius	H	5	322	11,936	3.2	382.24	445.95	95 56	48 22	47 32
Minnie of Elm Shade	A	4	296	9,469	3.77	357.60	417.20	89 40	45 24	44 16
Toitilla	H	7	276	9,309	3.6	337.17	393.36	84 29	47 81	36 48
Denty 10th	A	10	324	6,898	4.85	334.63	390.40	83 66	45 20	38 46
Abby Mercena Netherland	H	3	337	9,887	3.4	334.40	390.13	83 59	45 46	38 13
Bugle's Buttercup	J	11	317	6,484	5.0	326.05	380 39	81 51	33 67	47 84
Lady Nancie 2nd	A	8	315	8,153	3.93	320.44	373.85	80 11	43 94	36 17
Tibby Fizzaway	A	3	326	7,204	4.38	315.72	368.34	78 93	42 04	36 89
Molly Netherland	H	4	283	8,879	3.5	312.33	364.38	78 08	52 78	25 30
White Rose	A	5	293	6,973	4.43	308.83	260.30	77 21	42 54	34 67
Molly De Kol	H	7	355	7,803	3.9	307.26	358.47	76 81	44 59	32 22
Dewdrop's Aggie	J	7	365	5,536	5.37	297.23	346.77	74 31	36 31	38 00
Mercena Netherland	H	4	299	9,412	3.15	296.54	345.96	74 13	47 02	27 11
May Queen	A	7	285	8,091	3.63	293.90	342.88	73 47	36 01	37 46
King Joseph's Dream	J	4	336	5,609	5.0	280.34	327.06	70 08	38 85	31 23
Beauty O.A.C.	H	4	274	8,768	3.0	265.93	310.25	66 48	41 62	24 86
Buttercup's Queenie	J	10	304	5,036	5.1	257.32	300.20	64 33	32 43	31 90
Dolly	J	6	305	5,743	4.38	251.71	293.66	62 93	40 82	22 11
Inka Mercedes	H	9	294	7,388	3.3	246.14	287.16	61 53	38 01	23 52
Margaret Cornucopia	H	3	319	5,634	3.6	202.21	235.91	50 55	36 57	13 98
Average of 11 cows	H	5	306	9,468	3.43	325.09	379.27	81 27	46 84	34 43
" 5 "	J	8	325	5,681	4.97	282.53	329.62	70 63	36 41	34 22
" 6 "	A	6	306	7,798	4.12	321.85	375.49	80 46	42 49	37 97

NOTES ON HERD RECORD.

(1) In the column denoting breed, "H" stands for Holstein, "J" for Jersey, and "A" for Ayrshire.

(2) The cows are ranked in order of production of butter fat.

(3) The food consumed by each cow is merely a close approximation, as we have not yet found it practicable to keep an exact record of food consumed by each animal. The estimate, however, is reasonably close and the amount of feed is checked by occasional weighings.

(4) The foods have been valued as follows: Meal (including bran), $20 per ton; Oil cake, $32 per ton; Hay, $8 per ton; Roots, $2 per ton, and silage, $2 per ton. Pasture is valued at $1.00 per cow per month. These values are somewhat below present market prices, but we have aimed to take fairly average market values which might be used from year to year for purposes of comparison.

(5) At the foot of the table it will be noted that the averages made by each breed are given. The Holsteins lead in total production, but their cost of feed is somewhat higher than that of the other two breeds. In profit over cost of feed, the Ayrshires lead, and the Holsteins and Jerseys come very close. In fact, when we consider that the method of computing foods is merely an approximation, we may say that the three breeds have given practically equal results.

Experiments with Dairy Cattle.

Our experiments this year consist of comparisons of several concentrates. The bulky part of the ration was the same throughout all the experiments and consisted of mangels, corn silage, and mixed clover and timothy hay. An effort was made to keep this part of the ration as uniform as possible throughout the duration of the experiment.

Three cows were used in each experiment, and the experiment divided into three periods of two weeks each. During the first and third periods the cows were fed identically the same ration. During the second period a different ration was fed, and the results of the second period compared with the average of the first and third periods This arrangement allows for the natural decrease in milk flow as the period of lactation advances.

The milk and butter fat produced during the first week of each period has not been taken into consideration, only the second week of each period being considered. This plan was adopted to allow the cows to become accustomed to the change in feed, and it also tends to prevent the effects from the use of one kind of food being carried over into the next period.

Possibly no plan which can be devised is entirely satisfactory, and there are possibilities for error under any system. We have done our best to make the conditions the same throughout each experiment, but, no doubt, in spite of all our efforts, there would be variations in the character of the bulky fodders which might have an influence upon the results. Our results, therefore, must be regarded as approximations, and they are suggestive rather than absolutely conclusive. This, however, is true of all experiments with dairy cows, and is a condition of affairs which cannot be avoided. We think, however, that the work is not without its value, and if viewed in the proper light, should be helpful as a means of comparing some of the foods under consideration.

Oats *vs.* Oats and Barley.

Barley is not generally regarded with favor by dairymen, while oats have a good reputation as milk producers. Owing to the fact that oats have been so very dear during the past year or two, and that barley has cost considerably less per ton, we thought that it would be of interest to study the effect of adding a certain amount of barley to a meal ration of oats. Two experiments were conducted along this line. In the first experiment oats were fed for two weeks, then a mixture of two parts

oats and one part of barley for two weeks, followed by a two weeks' period of oat feeding. The following table shows milk and butter fat produced, and concentrates consumed by three cows:

	Period I. One week Oats.	Period III. One week. Oats.	Average of Periods I. and III. Oats.	Period II. One week. Oats and Barley.
Total milk produced by three cows.	614 lbs.	570 lbs.	592 lbs.	590 lbs.
Average milk per cow per day ...	29.24 lbs.	27.14 lbs.	28.19 lbs.	28.09 lbs.
Average per cent. of fat	3.92%	4.13%	4.02%	3.94%
Total fat produced by three cows.	24.055 lbs.	23.53 lbs.	23.792 lbs.	23.257 lbs.
Average fat per cow per day.....	1.145 lb.	1.12 lb.	1.133 lb.	1.107 lb.
Concentrates consumed by three cows	189 lbs.	189 lbs.	189 lbs.	189 lbs.
Oats, or oats and barley consumed per 100 lbs. fat produced.	.....	.....	794.38 lbs.	812 65 lbs.
Relative value of oats, and oats and barley for producing butter fat.....	.....	.....	102.29	100
Oats, or oats and barley consumed per 100 lbs. milk produced	....	.....	31.92 lbs.	32.03 lbs.
Relative value of oats and oats and barley for producing milk..	.....	.....	100.34	100

Before commenting on this table, we will submit another one where a larger proportion of barley was added to the oat ration. In the first period, oats alone were fed; in the second, equal parts of barley and oats, and in the third, oats alone, and the table given below shows results:

	Period I. One week. Oats.	Period III. One week. Oats.	Average of Periods I. and III. Oats.	Period II. One week. Oats and Barley.
Total milk produced by three cows.	570 lbs.	513 lbs.	541.5 lbs.	548 lbs.
Average milk per cow per day...	27.14 lbs.	24.43 lbs.	25.79 lbs.	26.09 lbs.
Average per cent. fat.....	4.13%	3.88%	4.01%	4.07%
Total fat produced by three cows.	23.53 lbs.	19.936 lbs.	21.733 lbs.	22.332 lbs.
Average fat per cow per pay.....	1.12 lb.	.949 lb.	1.035 lb.	1.063 lb.
Concentrates consumed by three cows.....	189 lbs.	189 lbs.	189 lbs.	189 lbs.
Oats, or oats and barley consumed per 100 lbs. fat produced.	.....	.....	869.64 lbs.	846.32 lbs.
Relative value of oats, and oats and barley for producing butter fat.....	.....	.....	100	120.71
Oats, or oats and barley consumed per 100 lbs. milk produced.....	.....	.....	34.903 lbs.	34.854 lbs.
Relative value of oats, and oats and barley for producing milk..	.....	.....	100	101.2

Comments.

Though barley is not, as a rule, a particularly palatable food, still the cows on the whole seemed to relish the mixture of oats and barley rather better than the ration of clear oats.

The last two columns of each table really show the comparisons. The first two columns merely give a comparison of the first and third periods, which may be of interest to some who wish to study the experiments in detail.

In the first experiment, it will be noted that the cows gave practically the same amounts of milk, yielding practically equal amounts of butter fat on the two rations. There is, it is true, a slight difference, but so slight that even a greater difference might occur had the same ration been fed throughout.

In this experiment, therefore, the addition of one part of barley to two parts of oats did not apparently decrease the efficiency of the ration.

In the second table it will be noted that the cows gave somewhat more milk and yielded more butter fat upon the mixture of oats and barley than upon oats alone.

A peculiar feature is the fact that the increase in fat upon oats and barley as compared with oats is relatively greater than the increase in milk. As milk producers, the two rations may be said to be practically equal, there being a very slight advantage in favour of the mixture of oats and barley.

Owing to the fact that the fat in milk will vary when conditions are made as nearly the same as possible, and is subject to wider variations than the yield of milk, we regard the comparison of the rations on the basis of milk production as more satisfactory than the comparison on the basis of fat production. In this second experiment, therefore, the indications are that the mixture of equal parts of oats and barley proved equal to the ration of oats alone, the difference being so slight that it might be disregarded.

Oats vs. Bran.

Oats and bran are both well known dairy foods, and yet there seems to be a great scarcity of information regarding their relative value for milk production. For this reason we ran through a single experiment to compare these two foods. It will be borne in mind that each period consisted of two weeks, though only one week of each period is reported. On the whole, the cows ate the ration consisting of bran rather better than the oats, though there was very little difference in this respect. The following table shows milk and butter fat produced and concentrates consumed by three cows:

	Period I., One week Bran.	Period III., One week Bran.	Average of Periods I. and III. Bran.	Period II., One week, Oats.
Total milk produced by 3 cows...	569 lbs.	485 lbs.	527 lbs.	552 lbs.
Average milk per cow per day....	27.09 lbs.	23.09 lbs.	25.09 lbs.	26.28 lbs.
Average per cent fat.....	3.18%	3.46%	3.32%	3.31%
Total fat produced by 3 cows.....	18.153 lbs.	16 819 lbs.	17.486 lbs.	18.304 lbs.
Average fat per cow per day.....	.864 lb.	.800 lb.	.832 lb.	.871 lb.
Concentrates consumed by 3 cows.	189 lbs.	189 lbs.	189 lbs.	189 lbs.
Oats or bran consumed per 100 lbs. fat produced.....	.....	.....	1080.86 lbs.	1032.56 lbs.
Relative value of oats and bran for producing butter fat.....	.....	.....	100	104.6
Oats or bran consumed per 100 lbs. milk produced.....	.....	.....	35.86 lbs.	34.24 lbs.
Relative value of oats and bran for producing milk.....	.....	.....	100	104.7

Comments.

It will be noted by comparing the first period with the third, that the milk flow was fairly well maintained, indicating that both oats and bran are fairly satisfactory rations. It will be noted, also, that if we place the value of bran as shown by this experiment at one hundred, oats show a value of 104.6 for butter fat production, and 104.7 for milk production. In this experiment, therefore, the relative value of oats as compared with bran remains practically constant in both fat and milk production.

There is a slight advantage in favour of oats, namely, a little less than five per cent. At present prices, therefore, bran would be a very much more economical ration for cows than oats.

Bran vs. Bran and Oil Meal.

Though a liberal ration of bran seems to maintain the flow of milk fairly well, we have found in our everyday experience that the addition of oil meal will often help to improve the milk flow, especially if there is considerable timothy in the hay ration.

In this experiment, the cows were fed nine pounds of bran each per day for two weeks, then for two weeks they were fed seven pounds of bran and two pounds of oil meal, followed by a two week period of bran, fed as before. As in previous experiments, only the second week of each period is considered. The table which follows shows milk and butter fat produced, and concentrates consumed by three cows:

	Period I. One week. Bran.	Period III. One week. Bran.	Average of Periods I. and III. Bran.	Period II. One week. Bran and Oil Cake.
Total milk produced by 3 cows ..	485 lbs.	443 lbs.	464 lbs.	500 lbs.
Average milk per cow per day....	23.09 lbs.	21 09 lbs.	22.09 lbs.	23.81 lbs.
Average per cent. of fat.....	3.47%	3.28%	3.38%	3.336%
Total fat produced by 3 cows	16.819 lbs.	14.549 lbs.	15.684 lbs.	16.68 lbs.
Average fat per cow per day.....	.8 lb.	.693 lb.	.747 lb.	.794 lb.
Concentrates consumed by 3 cows.	189 lbs.	189 lbs.	189 lbs.	189 lbs.
Bran, or bran and oil meal consumed per 100 lbs. fat produced.	.....	.....	1205.05 lbs.	1133.09 lbs.
Relative value of bran, and bran and oil meal for producing butter fat.....	.....	.....	100	106 3
Bran, or bran and oil meal consumed per 100 lbs. milk produced	.....	.....	40.73 lbs.	37.8 lbs.
Relative value of bran, and bran and oil meal for producing milk.	.....	.. ..	100	107.7

Comments.

It will be noted that the substitution of two pounds of oil cake for two pounds of bran in the ration increased the flow of milk to a certain extent.

On the basis of milk production, the ration of bran and oil meal proved nearly eight per cent. higher in value than the ration of bran alone. (See bottom line of table.)

Owing to the higher cost per ton of oil meal, the increase in milk flow scarcely paid for the increase in the cost of the ration due to the addition of oil meal.

The statement in the preceding paragraph does not take into consideration the importance of maintaining the milk flow and its possible effect upon the milk yield for a whole period of lactation, and it is quite probable that the use of oil meal would be profitable in the long run under many conditions.

It is quite probable that in another experiment a considerably larger increase in production might be obtained through the use of oil meal.

Bran vs. Molac Dairy Food.

In last year's report will be found a comparison of a mixture of oats and bran with a mixture of oats and Molac. This year, however, we took the two foods separately, feeding an exclusive meal ration of bran for two weeks, followed by two weeks on Molac, with a return to bran for a final period of two weeks. Nine pounds per cow per day of each kind of concentrate were fed. Following is the table showing milk and butter fat produced, and concentrates consumed by three cows:

	Period I. One week. Bran.	Period III. One week. Bran.	Average of Periods I. and III. Bran.	Period II. One week. Molac.
Total milk produced by 3 cows...	552 lbs.	570 lbs.	561 lbs.	634 lbs.
Average milk per cow per day....	26.29 lbs.	27.14 lbs.	26.71 lbs.	30.19 lbs.
Average per cent. of fat.....	3.66%	3.69%	3.68%	3.51%
Total fat produced by 3 cows	20.23 lbs.	21.036 lbs.	20.633 lbs.	22.261 lbs.
Average fat per cow per day.....	.963 lb.	1.001 lb.	.982 lb.	1.06 lb.
Concentrates consumed by 3 cows.	189 lbs.	189 lbs.	189 lbs.	189 lbs
Bran or Molac consumed per 100 lbs. milk produced.....	.....	.....	916 lbs.	849.02 lbs.
Relative value of bran and Molac for producing butter fat	.....	.....	100	107.89
Bran or Molac consumed per 100 lbs. milk produced	.....	.....	33.69 lbs.	29.8 lbs.
Relative value of bran and Molac for producing milk.....	.....	.....	100	113.05

Comments.

Molac dairy food is especially palatable and is greatly relished by cows.

In general it may be said that its composition is very similar to that of bran, and its main claim to favor is its palatability.

It will be noted that the cows yielded considerably more milk on Molac than on bran, though the per cent. of fat was lower with the larger milk yield, making the total fat yield scarcely in proportion to the milk yield.

As previously stated, we prefer to compare the foods on the basis of milk yield, and upon this basis Molac proved thirteen per cent. higher in feeding value than bran (see last line of table). This is scarcely so good a showing as was made by Molac last year, and it is impossible to say whether the difference was due to

individual differences in the cows, or whether the Molac differed in composition from that used last year. A food made up such as this food is may vary more or less in composition, which is one of the greatest objections to a food of this kind.

Bran vs. Sugar Beet Meal.

Sugar beet meal consists of the dried beet pulp after the sugar has been extracted. The pulp is ground and will keep practically as well as bran. The cost of this product will no doubt vary in different districts, but, as a rule, it can be obtained at a lower price than bran.

We aimed to feed nine pounds per cow per day of the concentrated food, and the division of the time of the experiment was the same as in previous experiments. Following is a table showing milk and butter fat produced, and concentrates consumed by three cows:

——	Period I. One week. Bran.	Period III. One week. Bran.	Average of periods I and III. Bran.	Period II. One week. Sugar Beet Meal.
Total milk produced by three cows	659 lbs.	552 lbs.	605.5 lbs.	556 lbs.
Average milk per cow per day ...	31.38 lbs.	26.29 lbs.	28.83 lbs.	26.48 lbs.
Average per cent. fat	3.5%	3.66%	3.57%	3.35%
Total fat produced by three cows.	23.064 lbs.	20.23 lbs.	21.647 lbs.	18.619 lbs.
Average fat per cow per day.....	1.098 lbs.	.963 lbs.	1.031 lbs	.886 lbs.
Concentrates consumed by three cows	189 lbs.	189 lbs.	189 lbs.	189 lbs.
Bran or S. B. meal consumed per 100 lbs. fat produced	.....	.....	873.1 lbs.	1015.09 lbs.
Relative value of bran or S. B. meal for producing butter fat..	.....	.....	116.26	100
Bran or S. B. meal consumed per 100 lbs. milk produced.....	.....	.....	31.21 lbs.	33.99 lbs
Relative value of bran and S. B. meal for producing milk.....	.....	.....	108.9	100

Comments.

The great difficulty with the sugar beet meal is its lack of palatability. Some of the cows ate it fairly well, but all of them preferred bran. One cow, however, decidedly objected to eating the sugar beet meal and it was with the greatest difficulty that we induced her to eat it. This was an unsatisfactory feature of the experiment, and no doubt interfered with the results. At the same time, we do not consider it unfair to give comparisons of results, because palatability is a very important feature of a ration, and if the milk yield is decreased as a result of lack of palatability, the food which possesses this objectionable feature should be charged with the decrease. It is possible, however, that for an extended period of feeding, sugar beet meal might show up to better advantage, because the chances are that the cows would become accustomed to it in time and would probably eat it more satisfactorily.

In spite of the drawback of unpalatability, sugar beet meal measures up fairly well with bran on the basis of milk production, bran showing about nine per cent. higher feeding value in this experiment. For the production of butter fat, bran

shows to better advantage, though, as stated before, we regard the milk as a safer guide.

Sugar beet meal, if it can be procured at a considerably lower price than bran, is well worth consideration, and the chances are that most cows could be taught to eat it satisfactorily in the course of time.

Molac Dairy Food vs. Tillson's Dairy Food.

These are two foods of very similar composition, but Molac is somewhat the more palatable of the two. These two foods were each fed combined with an equal quantity of bran, the total meal ration per day being ten pounds, and the time was divided into three periods as in the other experiments. The following table shows the milk and butter fat produced, and concentrates consumed by three cows:

	Period I. One week. Tillson's and Bran.	Period III. One week. Tillson's and Bran.	Average of periods I and III. Tillson's and Bran.	Period II. One week. Molac and Bran.
Total milk produced by three cows	574 lbs.	558 lbs.	566 lbs.	566 lbs.
Average milk per cow per day ...	27.33 lbs.	26.57 lbs.	26.95 lbs.	26.95 lbs.
Average per cent. fat	3.59 %	3.64 %	3.61%	3.64 %
Total fat produced by three cows.	20.591 lbs.	20.331 lbs.	20.461 lbs.	20.62 lbs.
Average fat per cow per day.....	.979 lbs.	.968 lbs.	.974 lbs.	.982 lbs.
Concentrates consumed by three cows	Bran 105 lbs. Tils. 105 lbs.	Bran 105 lbs. Tils. 105 lbs.	Bran 105 lbs. Tils. 105 lbs.	Bran 105 lbs. Molac 105 lbs.
Tillson's or Molac consumed per 100 lbs. butter fat produced....			513.12 lbs.	509.21 lbs.
Relative value of Tillson's and Molac for producing butter fat.			100	100.76
Tillson's or Molac consumed per 100 lbs. milk produced.....			18.55 lbs.	18.55 lbs.
Relative value of Tillson's and Molac for producing milk.....			100	100

Comment.

The table calls for very little comment, for the reason that in this experiment the two foods proved identical in value.

EXPERIMENTS WITH SWINE.

During the past summer we did considerable work in comparing various dairy by-products. The first of these experiments deals with pasteurized whey and ordinary whey.

It will be noted that three separate tests were made. In the first two tests, only about two and one-half pounds of whey were used with each pound of meal, but in the third test, between five and six pounds of whey were used for every pound of meal.

The groups receiving water and meal were used as check groups and enable a person to determine the amount of meal saved by a given quantity of whey.

The following table gives details of the experiments:

TABLE SHOWING WEIGHTS, GAINS, AND FOOD CONSUMED IN THREE TESTS WITH PASTEURIZED AND ORDINARY WHEY.

	Group I. Water and Meal.			Group II. Pasteurized Whey and Meal.			Group III. Ordinary Whey and Meal.		
	1st Test. 8 pigs.	2nd Test. 4 pigs.	3rd Test. 4 pigs.	1st Test. 8 pigs.	2nd Test. 4 pigs.	3rd Test. 4 pigs.	1st Test. 8 pigs.*	2nd Test. 3 pigs.	3rd Test. 4 pgs.
Days of experiment ...	104	90	90	104	90	90	104	90	90
Weight of pigs at commencement of experiment	lbs. 422	lbs. 269	lbs. 283	lbs. 361	lbs. 253	lbs. 280	lbs. 297	lbs. 215	lbs. 281
Weight of pigs at close of experiment.....	1,178	705	648	1,310	797	779	1,256	653	795
Total gain in weight ..	756	436	365	949	544	499	959	438	514
Average daily gain per pig.....	.909	1.21	1.01	1.14	1.51	1.38	1.23	1.62	1.43
Total food consumed:									
Meal	2,956	1,564	1,412	2,849	1,547	1,344	2,795	1,298	1,363
Whey	.....	.....	.....	7,570	3,335	7,365	7,270	2,653	7,365
Food consumed per 100 pounds increase in weight:									
Meal	391	358.7	386.8	300.2	284.4	269.3	291.4	296.3	265.2
Whey	.....	.....	.....	797.7	613.0	1,475.9	758.1	605.7	1,432.9

* In the first test, Group III. started with eight pigs, but finished with seven pigs. Due allowance has been made in the calculation.

In order to simplify results, another short table is given which summarizes the material contained in the first table and simplifies the comparisons. It shows the amount of meal saved by one hundred pounds of pasteurized whey and one hundred pounds of ordinary whey in each test, and also the average of three tests.

SUMMARY AND AVERAGES OF TESTS WITH PASTEURIZED AND ORDINARY WHEY.

	1st Test.	2nd Test.	3rd Test.	Average of three Tests.
100 lbs. pasteurized whey proved equal to.....	11.38 lbs. meal	12.12 lbs. meal	7.96 lbs. meal	10.12 lbs. meal
100 lbs. ordinary whey proved equal to.....	13.13 lbs. meal	10.29 lbs. meal	8.49 lbs. meal	10.55 lbs. meal

Notes on Results.

(1) In two of the three tests, ordinary whey proved superior to pasteurized whey, and in one test, pasteurized whey gave better results than ordinary whey.

(2) The average of three tests shows the two kinds of whey to be very close in feeding value, though on an average, ordinary whey shows about four per cent. higher feeding value than pasteurized whey.

(3) It is interesting to note the amount of meal saved by one hundred pounds of whey in the third test as compared with the first and second tests. As stated before, a much larger proportion of whey in proportion to meal was used in the third test than in the other two, and the effect has been to distinctly lessen the amount of meal saved by one hundred pounds of whey. The result is quite in harmony with the results of other experiments of this nature. Whenever dairy by-products, such as skim-milk, butter-milk, or whey, are used in very large quantity, the amount of meal saved by one hundred pounds of dairy by-product is less than when the dairy by-product is used in smaller quantity in proportion to the meal.

(4) In general, it may be said that these three tests go to show that there is very little difference in value between pasteurized and ordinary whey, the difference, if any, being in favor of ordinary whey.

Separated Whey *vs.* Ordinary Whey.

This experiment is a continuation of last year's work and two experiments were conducted during the past summer. Great care was exercised in the selection of the pigs used in each experiment, and in each case rather better pigs were put in the check groups on water and meal than in the whey groups. This plan was followed in order that we might feel absolutely certain that our results were not too favorable to whey.

The following table shows details of the experiment.

Table Showing Weights, Gains, and Food Consumed on Separated Whey and Ordinary Whey.

	Group I. Water and meal.		Group II. Separated whey and meal.		Group III. Ordinary whey and meal.	
	1st Test 8 pigs.	2nd Test. 4 pigs.	1st Test. *8 pigs.	2nd Test. 4 pigs.	1st Test. 8 pigs.*	2nd Test. 3 pigs.
Days of experiment.....	104	90	104	90	104	90
Weight of pigs at commencement of experiment.....	422 lbs.	269 lbs.	302 lbs.	261 lbs.	297 lbs.	215 lbs.
Weight of pigs at close of experiment.....	1,178 lbs.	705 lbs.	1,195 lbs.	763 lbs.	1,256 lbs.	653 lbs.
Total gain in weight.....	756 lbs.	436 lbs.	893 lbs.	502 lbs.	959 lbs.	438 lbs.
Average daily gain per pig.	.909 lb.	1.21 lb.	1.12 lbs	1.39 lbs.	1.23 lbs	1.62 lbs.
Total food consumed:						
Meal.....	2,956 lbs.	1,564 lbs.	2,807 lbs.	1,516 lbs.	2,795 lbs.	1,298 lbs.
Whey	.....	.....	7,270 lbs.	3,335 lbs.	7,270 lbs.	2,653 lbs.
Food consumed per 100 lbs. increase in weight:						
Meal.....	391 lbs.	358.71 lb.	314.33 lbs.	301.99 lbs.	291.45 lbs.	296.35 lbs.
Whey	.....	.....	814.11 lbs.	664.34 lbs	758.08 lbs.	605.71 lbs.

* Groups II. and III. in the first test each started with 8 pigs, but one pig was discarded from each group before the close of the experiment, due allowance being made in computing results.

From the table just given, we have made the following summary which gives a very clear comparison of the two kinds of whey.

SUMMARY OF RESULTS WITH SEPARATED AND ORDINARY WHEY.

—	1st Test.	2nd Test.	Average of two Tests.
100 lbs. ordinary whey proved equal to...	13.13 lbs. meal	10.29 lbs. meal	12.13 lbs. meal.
100 lbs. separated whey proved equal to..	9.41 lbs. meal	8.54 lbs. meal	9.12 lbs. meal.

Comments.

(1) In each experiment one hundred pounds of ordinary whey proved equal to a larger amount of meal than one hundred pounds of separated whey.

(2) Taking the average of the two experiments, we find that if we represent the value of separated whey by 100, the value of ordinary whey would be represented by 133. In other words, ordinary whey proved 33 per cent. higher in feeding value than separated whey.

(3) In last year's experiment with the same products, we found ordinary whey to be twenty-five per cent. higher in feeding value than separated whey, so that it will be seen that this year the difference between the two kinds of whey is more marked than last year. It is probably quite safe to say that ordinary whey is worth from twenty-five to thirty per cent. more than separated whey.

WHEY, SKIM-MILK AND BUTTER-MILK.

This experiment is also a continuation of work started last year, but, owing to circumstances, we were able to run only one test with a small number of pigs in each group. This is an unsatisfactory feature of the experiment, but the pigs were carefully selected. As in the other experiments, the group receiving water and meal served as a check group and enabled us to make a comparison.

Following is a table showing details of the experiment:

TABLE SHOWING WEIGHTS, GAINS AND FOODS CONSUMED.

—	Group I. 4 pigs. Water and meal.	Group II. 3 pigs. Ordinary whey and meal	Group III. 4 pigs. Skim-milk and meal.	Group IV. 4 pigs. Butter-milk and meal.
Duration of experiment.....	90 days.	90 days.	90 days.	90 days.
Weight of pigs at commencement of experiment.....	269 lbs.	215 lbs.	249 lbs.	235 lbs.
Weight of pigs at close of experiment	705 lbs.	653 lbs.	796 lbs.	823 lbs.
Total gain in weight.....	436 lbs.	438 lbs	547 lbs.	588 lbs.
Average daily gain per pig.....	1 21 lbs.	1.62 lbs.	1.52 lbs.	1.63 lbs.
Total food consumed.....	Meal. 1,564 lbs.	Meal, 1,298 lbs. Whey,2,653 lbs.	Meal, 1 519 lbs. Skim-milk, 3,335 lbs	Meal. 1,516 lbs. Butter-milk, 3,335 lbs.
Food consumed per 100 lbs. increase in weight	Meal, 358.71 lbs.	Meal,296.35 lbs. Whey, 605.71 lbs.	Meal, 277.7 lbs. Skim-milk, 610.05 lbs.	Meal,257.82 lbs. Butter-milk, 567.19 lbs.

Following is a short summary of the results showing relative values of whey, skim-milk, and buttermilk in the matter of saving meal:

100 lbs. whey proved equal to .....10.29 lbs. meal.
100 lbs. skim-milk proved equal to .....13.28 lbs. meal.
100 lbs. buttermilk proved equal to .....17.78 lbs. meal.

Comments.

(1) The most remarkable feature of this experiment is the marked superiority of buttermilk over skim-milk. If we represent the feeding value of whey as 100, skim-milk would be represented by 129.05, and buttermilk by 172.78. In this experiment, therefore, buttermilk proved nearly thirty-four per cent. higher in feeding value than skim-milk.

(2) In looking for the reason for this marked difference between buttermilk and skim-milk, we find that the buttermilk used in this experiment would average about .4 per cent. butter fat; whereas, the skim-milk, which was separator milk, ran only about .05 per cent. of fat, that is to say, the skim-milk contained only about one-eighth as much fat as the buttermilk. In hot weather the butter fat in buttermilk is apt to run somewhat high, and our 1909 experiments commenced in June and ended in August, so that it was conducted during the hottest part of the summer. No doubt much of the difference between these two products shown in this experiment can be accounted for on the basis of difference in fat content.

(3) Generally speaking, buttermilk and skim-milk are practically equal in feeding value, but buttermilk is a more variable product than skim-milk. In some cases, it may be worth considerably more, as in the case which has just come under our notice, and in other cases, where more water is incorporated with the buttermilk, it may be worth less than skim-milk. This tendency to vary in feeding value tends to detract from the market value of buttermilk. Skim-milk is much more uniform in composition and feeding value.

Respectfully submitted.

G. E. DAY.

PART XII.

THE LECTURER IN HORTICULTURE.

To the President of the Ontario Agricultural College:

Sir,—Academic work in Fruit and Vegetable Growing has been subject to no important change since last year. Classes have been increasing in size of late years rather faster than have facilities and equipment for their accommodation, so that more class room and laboratory space is urgently needed.

The two weeks' Special Short Course in Fruit Growing, held last winter, was successful in every way. The attendance was very encouraging but still larger numbers are hoped for next year. The attention of beginners and especially of young men is directed to this course. Prof. John Craig, College of Agriculture, Cornell University; Messrs. A. McNeill, R. Thompson, W. T. Macoun, D. Johnson, H. Jones, P. J. Carey, J. E. Johnson and others rendered valuable assistance and we desire hereby to thank them for their generous aid.

Addresses on fruit subjects were delivered at the following points in connection with special Fruit Institute meetings: Forest, Simcoe, Delhi, Waterford, Oshawa, Port Perry, and Cobourg.

Experimental work with fruit in the College plantations has not progressed this season. The unfavorable site occupied by the cherries, plums, pears, and raspberries has operated seriously against success, and the tree fruits mentioned have, as a matter of fact, been almost entirely destroyed by their unfavourable environment. We are quite convinced, after having studied the subject very carefully, that a much larger quantity of apples and other fruits could be produced in this locality than is now done. In former years considerable quantities of apples were shipped from Guelph and nearby stations, but of recent years the production has declined almost entirely. The reason is simply because tender varieties composed to a large extent the original plantings, and these have been recently weeded out by one or two unusually severe winters. There is no reason why commercial plantings should not be made again as apples are successfully produced under much more severe conditions than exist in this locality. The St. Lawrence Valley, for instance, is famous for its Snows and McIntosh Reds, and these are grown to perfection in spite of winter temperatures which average several degrees lower than those experienced here. As stated above, the solution lies largely in the choice of hardy varieties, and these have, fortunately, been determined by careful and extended tests in the College orchards. Plantings made twenty or more years ago contained varieties which we now consider to have perfectly proven their commercial value for this section. These are Duchess, Alexander, Wealthy, Colvert, and Snow. To this list we would add McIntosh Red, as we are persuaded of its value after having observed the variety under many conditions elsewhere and after having tested it in our own orchard for thirteen years.

The second serious difficulty lies in the selection of a suitable location. A well-drained, elevated situation is essential to success, and, where these conditions can be combined with a southerly slope, success in fruit growing is then simply a matter of intelligent care. The College has been unfortunate in that suitable land for planting was not available when the present orchards were set out. Up to the

present time the work done has consisted very largely of variety testing. The present orchards have fulfilled their purpose in this respect and valuable information concerning the behavior of varieties has been gained. Advance must be made, however, and although results in variety testing have been secured under existing unfavorable conditions, the nature of the work next to be taken up demands that conditions be made as favorable as possible. The future of fruit work here depends simply upon the acquisition by this department of land suitable to the purpose and on which fruit could be grown under the most favorable conditions of soil and location. There are many problems in fruit culture on which we should be able to speak with authority and which we are at present unable to study satisfactorily because of the lack of suitable equipment of this nature. We are firmly convinced, for instance, that apple production in this vicinity could be made profitable. As an educational institution we might logically be expected to *demonstrate* that fact, but on land such as we occupy at present an attempt at such a demonstration would be almost certain to fail. The climate of Guelph is fairly representative of that of a great proportion of older Ontario and such a demonstration, if successfully carried out, would be of the greatest value to all of the similarly situated inland and northern counties of the Province. It would be of great value, too, to the lake and southern sections of the Province in that many visitors from those important localities come to the College annually, especially during the summer months, and modern methods of orchard handling would through them become widely known. It would also enable those who are looked to for information on fruit subjects to speak with the authority which comes from actual experience in fruit production. It was our great privilege this past summer to visit some of the famous fruit-growing sections of British Columbia, Oregon, California, and Colorado. We were particularly impressed with the fact that the most up-to-date growers in these localities are usually the men who are in closest touch with their respective Departments of Agriculture, Agricultural Colleges or Experiment Stations. In each case the excellence of the equipment possessed is the measure of the interest taken by the growers. If this department is to be of value to the fruit growers of Ontario, it is imperative that suitable equipment be provided for the prosecution of experimental work, and we earnestly commend the circumstances outlined above to your careful consideration.

Orchard Surveys.

In co-operation with the Fruit Branch of the Department of Agriculture, Orchard Surveys were conducted in the Lake Huron district, Simcoe County, Kent County, and a portion of the Niagara district. Information was secured which will be valuable to the growers in the localities covered and to many others as well. Special reports on this work cannot be included here but will be issued by the Fruit Branch, Department of Agriculture, Toronto.

Spraying.

For a valuable account of experiments conducted in spraying for apple scab and codling worm, see the Report of the department of Entomology.

Vegetable Gardening.

Mr. A. McMeans, in charge of experimental work in Vegetable Gardening, reports as follows:

The past season gave us very fair vegetable crops as a whole, though the spring was rather backward owing to continued wet weather. Growth came along with a rush and most crops will average up well.

The one exception was the onion crop. The date of seeding this year was rather late and when the plants should have been "bulbing out" they were attacked by thrips. This, combined with the dry weather at that time, cut the crop short at least 25 per cent.

Addresses were delivered to the onion growers of the Scotland and Leamington districts which resulted in the formation of co-operative associations by the growers of these districts for the better production and distribution of their onion crops. Addresses on various topics connected with vegetable growing were given at special fruit or regular Institute meetings at the following places: Collingwood, Leamington, Scotland, Oakville and Simcoe; at Toronto, to the members of the Toronto Branch of the Ontario Vegetable Growers' Association, and also at the annual convention of the Vegetable Growers' Association. Some judging was also done at a few of the fall fairs.

It was my privilege to spend some time in the chief cabbage and cauliflower sections of the United States, studying their methods of production, storage and marketing. This work was done for the Provincial Department of Agriculture on behalf of the Ontario Vegetable Growers' Association, and a full account of the same will appear in the Association's Report.

Variety Tests.

Variety tests were carried on again this season, with results much the same as last year. For that reason they are omitted.

Seed Selection.

Valuable and encouraging work in seed growing and selection with beans, sweet corn, cabbage, and onions was continued from last year, but results along these lines are necessarily slow and as yet are not sufficiently advanced for publication.

Irrigation.

Owing to the continued dry weather this summer, it was thought advisable to try irrigation on some of the vegetable crops. For this purpose a small plot was set aside and equipped with the Skinner system of irrigation. Although it was rather late in the season, the effect on the plot of celery to which the water was applied was so noticeable that it is the present intention to enlarge the irrigation plant and test it out thoroughly on a number of vegetable crops next season.

Keeping Test of Onions.

On October 3rd one thousand Globe Danvers onions were carefully screened, weighed, and marked. They were placed in slatted crates in an open shed along with the rest of the crop of onions. On October 31st, owing to cold weather, the crop was removed to the storage house for the winter. On April 27th the marked crates were again emptied on the screen and all loose peelings, growing and otherwise unmarketable onions, were removed. Following are the results: Original weight of 1,000 onions, 180 lbs.; unmarketable, 22 or 2.2 per cent.; weight of good onions, 164 1-4 lbs., a total shrinkage of 15 3-4 lbs., or 8.75 per cent.

Keeping Test of Varieties of Onions.

Variety.	Seedsman.	Percentage good.
Apple-shaped Red Globe	Vaughan	100
Ivy Yellow	Maule	100
New Ebenezer	Johnson	100
Ailsa Craig	Simmers	99
Ailsa Craig	Vick	98
James Long Keeping	Ewing	98
Southport Yellow Globe	Steele-Briggs	98
Yellow Globe Danvers	Bruce	98
Michigan Globe	Ferry	98
Australian Brown	Simmers	97
Flat Danvers	Simmers	97
Market Maker	Rennie	97
Prizetaker	Steele-Briggs	97
Ailsa Craig	Sutton	96
Southport Red Globe	Bruce	96
Southport Red Globe	Steele-Briggs	96
Golden Globe	Burpee	*95
New Commercial	Maule	95
Southport White Globe	Steele-Briggs	95
Dark Red Beauty	Johnson	94
Model Yellow Globe	Bruce	94
Prizetaker	Bruce	94
White Portugal	Simmers	91
Red Wethersfield	Bruce	90
Red Wethersfield	Steele-Briggs	90
Gibraltar	Burpee	*63
Giant Brown Rocca	Steele-Brigg	22
Red Tripoli	Simmers	14
Early Rose	Burpee	12

* Starting growth at the root.

Date of storage, October 3rd, 1908.

Date of examination, April 27th, 1909.

Length of test, 206 days. Conditions the same as test of Yellow Globe Danvers mentioned above.

Respectfully submitted.

J. W. CROW.

PART XIII.

THE PROFESSOR OF LANDSCAPE GARDENING.

To the President of the Ontario Agricultural College:

SIR,—I have the honor of presenting herewith my seventeenth annual report.

In doing so, it is a satisfaction to look back over the past and note the progress that has been made in all branches of Horticulture, both at the College and throughout the country, in these seventeen years.

When I first took charge of the department, the course in Horticulture was limited to about half a dozen lectures, principally on fruit growing, given only to the sophomore students. Our curriculum now offers a comprehensive course of instruction on four of the leading branches of Horticulture, viz.: Pomology, or fruit growing; Olericulture, or vegetable gardening; Floriculture; and Landscape Gardening, and the work is now taken by the freshmen, sopohomore, and senior classes. Short courses adapted to the needs of special classes have also been arranged and are given every year to the ladies' classes from the Macdonald Institute, the Normal School teachers' classes in Elementary Agriculture and Horticulture, and to the short course class in commercial fruit growing. This all goes to show how rapidly our work at the College is growing, yet it is no more than keeping pace with the development and progress that is going on in the country all about us. The numerous horticultural organizations which have been formed, both amateur and commercial, in all branches of the work indicate how the horticultural interests of the province are developing and specializing, and if we are to keep pace, let alone lead, in this work our department here must still widen its scope and strengthen every branch of the work. No other department of the College serves a wider constituency than ours, for it is not limited to the country alone, but aids the town and city as well. We are not serving any limited section of the people, but the whole country.

Specialization of work and concentration of effort are the means we must adopt if we are to make our work still more effective. A start has been made in this direction by which Mr. Crow assumes control of the work in Pomology and Olericulture. The report under these heads will, therefore, be found in Mr. Crow's report.

Mr. Wm. Hunt has been giving good service in the floricultural section of the work, both at the College and throughout the Province.

With this division of labor, I have been able to give much of my time to developing the work in landscape gardening, a branch in which the call for definite and reliable information has become more and more urgent of late years.

I.—LANDSCAPE GARDENING.

It is apparent to all who read or travel that a wave of civic and rural improvement has set in on this continent. Our aim in this department is to promote the movement in every way possible, and we confidently look forward in the near future to a much better and more beautiful Canada. In this connection we may quote from a recent editorial in one of our leading daily papers, to show the atti-

tude of the press to such work: "We freely pay every deserved tribute to those who strive to make Canada great and powerful. We recognize the services of those who aim to make the Dominion rich and prosperous. We have still higher honors for those who would strengthen the Dominion in virtue and the larger hope. Along these upward paths there is a growing appreciation of the truth that every high aim is furthered in many subtle ways by those who are doing their part in making Canada beautiful."

Whatever may be the calls for assistance from outside, as College instructors our first duty is to our students. Lectures as outlined in the College curriculum have been given to students of the Freshmen, Sophomore, and Senior years. Instruction was also given to the short course classes at the Macdonald Institute, and to the Normal School teachers' classes in the summer, and the short course class in fruit growing during the winter. As far as possible, use is made of our beautiful campus with its large collection of trees and flowering shrubs to demonstrate the practical application of principles taught in the class room. Free use is also made of lantern slides, a valuable collection of which has been prepared for the purpose, which enables the eye to catch and fix on the mind impressions which could not be gained in any other way.

Meetings and Conventions.

During the year I have been privileged to attend a large number of conventions and meetings where I had the opportunity of speaking and helping on local improvements in both town and country. Addresses, nearly all of which were illustrated with stereopticon views, were given at the following places: Hamilton, Brantford, Oakville, Parkhill, Smith's Falls, Simcoe, Guelph, Ottawa, Toronto, Macdonald College, Ste. Anne de Bellevue, Vankleek Hill, Napanee, Elmira, Sutton West, St. Davids, Huntsville, Winona, Forest, Preston, Walkerton, Owen Sound, Clarksburg, Stratford, Oshawa, Woodstock, Galt, Picton, Niagara Falls and St. Catharines.

Some of these meetings were held under the auspices of the local Horticultural Society, others were under the auspices of the Agricultural Society, the District Improvement Society, the Board of Trade, the Scientific Association, the Teachers' Association or the Educational Association. By a careful observation and study of the local conditions previous to these talks, an effort was made to made them as practical and directly applicable to the immediate needs of the community as possible.

Assistance was also given at exhibitions by judging fruits at the Canadian National Exhibition, Toronto; the Ontario Fruit, Flower and Honey Show, Toronto, and a number of county and township exhibitions.

An event of more than local importance was the meeting of the American Pomological Society and the Society for Horticultural Science at St. Catharines in September last. These important international associations were brought to Canada as the result of an invitation we were privileged to join in extending to them at their last biennial meeting at Jamestown, Va., in 1907. When in Canada these associations accepted an invitation to visit the College and came in a special train and spent the day with us on September 18th.

Improvements on College Campus.

Following the removal of the row of large Norway spruce at the front of the campus, which had become very unsightly, a new cement walk was laid last spring along the whole front, and an irregular border made up of clumps of flowering shrubs was planted in the space left by the removal of the spruce. This has added greatly to the appearance of the place, and will in a few years transform that unsightly part of the campus into a beauty spot.

Plans have also been prepared for the systematic laying out and planting of the grounds about the Macdonald Hall, Institute, and Consolidated School, which have only recently come under the charge of this department. The planting of these grounds will therefore be undertaken as soon as weather permits next spring.

Improvement of School Grounds.

As a result of the distribution of the bulletin on the "Improvement of School Grounds," prepared by us for the Ontario Educational Department last year, there have been a great many requests from School Boards and Boards of Education for assistance in planning school ground improvements. Over forty schools have been so aided during the year. These have been scattered all over the country, from Niagara Falls to Fort William, and from Essex County to Prince Edward. This we look upon as a most important form of College extension work, for we believe that the general improvement of school grounds will soon show itself in the improvement of the homes of the people in both town and country, and in probably no other way could we reach the people more directly and effectively than through the schools of the country.

Prominent among the educational institutions where we have aided in improving their grounds this year are the Normal Schools at London, Stratford and Peterborough, and the Ladies' College at Whitby. The planting at London was completed last spring and at the other places mentioned the grounds were levelled and graded and prepared for planting next spring.

It is interesting to note that the desire for such improvement is not confined to the larger centres in Old Ontario, for the pioneers in the sparsely settled townships of New Ontario have also appealed to us to help in making their schools and school surroundings more nearly ideal. At the request of the trustees of the Hudson Township school located north-west of Cobalt, we visited that district last spring and gave assistance in locating and planning improvements for a new school in that northern section of the Province.

School and Home Gardens.

The various attempts that have been made to introduce agriculture in the rural schools of Ontario have clearly shown that the problem cannot be solved simply by the introduction of text-books upon the subject. Something more practical is necessary. The idea of giving the children an opportunity of learning the elementary lessons of plant growth through their own little gardens appears to be the simplest and most direct method of reaching the end desired. In connection with Professor McCready, of the Nature Study Department here, we have been making an effort to further this work by interesting the teachers. Through the co-operation of the school inspectors, we were able to get in touch with the teachers in each inspectorate who are most interested in such work and would direct the

children in the care of a little garden plot, either at the school or at home. We undertook, through the funds of the Experimental Union, to furnish the seeds and instructions necessary for beginning such work.

As a result of this effort we feel that a good start has been made. Seeds were distributed last spring to one hundred and forty schools, and over six thousand children were engaged in the care of these little garden plots this year. Most of the plots so far have been at the homes of the children, where parents and other members of the family could also take an interest in them. Probably from an economic as well as an educational standpoint, these little garden plots were better at the homes of the children than anywhere else, but we believe in time the necessity for locating them on the school grounds will become more and more apparent, and will lead to a general introduction of school gardens. Reports from the teachers on the success of the work so far are now being received, and a fuller account of which will be found in Prof. McCready's report before the Experimental Union.

Aiding Other Public Institutions.

It is some satisfaction to us, and no doubt more or less of a credit to our institution, that we are able to reach out and help other institutions engaged in other branches of the public service. Such assistance has at all times been given freely and gladly, and we hereby offer a helping hand in so far as we are able to any public institution in need of such assistance as we can give. Among the institutions other than schools and colleges we have helped during the year by advice and suggestive plans for planting and improvement have been the following: The South Lanark Agricultural Society; the Hospitals for Insane at Penetanguishene and London; the General Hospital, London; the Elliott Home, Guelph; the Brantford Golf Club; the Cemetery Board, Stratford; the Park Board, Smith's Falls.

Lessons from the West.

It was my privilege last summer to take a trip through the Canadian North-West as far as the coast. Through the kindness of one of our old students now in charge of the Forestry Branch of the C. P R., I was enabled to get in close touch with what is being done by that great railroad, and also in many towns and cities along the line, in the way of tree planting, station ground improvement, park management, care of streets and boulevards, etc. It was very clear to us that we in the east have much to learn from our more progressive neighbors of the west, particularly in the planting of trees along the railway right of way, improvement of station grounds, and making and maintaining of boulevards. Many photographs were taken which will be made use of in promoting such work in Ontario.

II.—FLORICULTURE.

The following report is prepared by Wm. Hunt, Lecturer in Floriculture in this department, who has direct charge of the work in floriculture.

Teaching.

The teaching in connection with this subject has increased considerably during the past year or two. This has been due largely to larger classes of students at both the College and Macdonald Institute, and additional classes in connection with the

summer school courses in Elementary Agriculture and Horticulture for Normal School teachers. Naturally this has made an increased demand upon our resources for space and material to carry on the work successfully. We are making the best use possible of the space at our disposal, but we are in need of more greenhouse accommodation to meet the requirements of our classes.

Correspondence.

This phase of the work is also increasing year by year, there being a growing demand for information on all features connected with plant and flower culture. To meet this growing demand, a number of articles on floriculture topics have been contributed from time to time to horticultural magazines.

Conventions and Exhibitions.

In addition to my regular college work, I have addressed a number of meetings throughout the country, and acted as judge at horticultural exhibitions at the following places: Brantford. Elmira, Owen Sound, Fergus, Stratford, Elora and Tillsonburg.

In conjunction with Mr. A. McMeans of this Department, I also inspected and made the awards in connection with the Guelph Horticultural Society's Lawn, Flower, and Vegetable Garden competition. These competitions have been productive of much good in arousing interest in such work in the city.

Chrysanthemums.

In the succession of floral displays in our greenhouses throughout the year, probably none arouses more interest than the chrysanthemums. Our collection of these has been kept up to date by the introduction of the best new varieties, and in this way we have already tested over four hundred kinds. The following have been selected as a few of the most desirable of the newer kinds representing the various types:

Pompon, or small double flower type, particularly suited for pot culture:

Snowdrop. Very profuse flowering habit, having pure white double daisy-like flowers.
Alena. Pale silvery pink. Free flowering. Very attractive.
Klondike. Bright yellow. Very showy and conspicuous.
Rose Marguerite. Anemone pompon. Deep rose. Free flowering.
Julia Lagravere. Deep red. One of the best of its color.
Panama. Rich bronzy red tipped with old gold. Very pretty.
Julia. Bronzy amber. Distinct and pretty.
Baby. The smallest pompon grown. Bright yellow. Odd and unique.
Beatrice Asmus. Pure white anemone flower. 2½ inches across. Beautiful for sprays.

Single Flowering Type:

Anna. Pure white. Free flowering. Petals twisted and rolled. One of the prettiest.
Ladysmith. Pale pink. Good pot plant. Pretty.
Lady Lu. True single. Pure white. Attractive flower.
Lily Beer. Pale lemon yellow. Free flowering.
Miss A. Holden. Pale straw color. Suffused magenta.
Miss Dorothy Deneen. Rose pink. Petals half quilled. Attractive.
Mizpah. Reddish crimson. Valuable for its free flowering and dwarf habit. Not new.
Golden Chain (Indicum). One of the oldest types. Small yellow flowers. Profuse. Trailing habit.

LARGE FLOWERING TYPE: The following are good varieties for pot culture:

Early Snow. Pure white. Early. Free. Good habit. An acquisition among the early varieties.
Frison d'Or. True incurve. Color rich bronzy red, margined and tipped old gold. Beautifully feathered.
Golden Glow. Rich golden, incurve. Early. Good habit.
Golden King. Golden yellow. Dwarf habit. Early.
Improved Chadwick. Pure white incurve. A superb flower.
Pacific Supreme. A good early pink.
Rose Pockett. Very large tassel-shaped, bronzy yellow flowers. Unique.
White Cloud. Very free flowering. Large flowers. Habit rather too tall for pot plant.

NEW GERANIUMS.

About twenty of the newer varieties of these have been tested. The following single varieties have points of merit that make them worthy of a place on the list with the standard older varieties. None of the double varieties tested were of sufficient merit to warrant special mention.

Alice of Vincennes. Large truss. White, suffused and margined carmine and scarlet Aureole type of flower.
Eugene Sue. Immense trusses of bright scarlet.
Sir Fred Trevor. Crimson scarlet. White eye. Large flower.
The Sirdar. Brilliant scarlet. White eye. Very large flower.
Tiffin. Scarlet, upper petals, shaded magenta. Robust grower. Good bedder.

ANNUALS.

About one hundred varieties of annuals were grown in the flower borders this year. The following include some of the more recent introductions worthy of note:

Dimorphotheca aurantiaca (Namaqualand Daisy). A pretty little annual, having a glossy salmon-orange shaded flower with black central ring, something like *Gazania splendens.* A good annual for a sunny border.
Eschscholtzia. (Dainty Queen.) A delicate coral pink, flower margined and suffused with a darker shade on ground work of cream color. Dwarf. Compact. 1 ft.
Eschscholtzia. (Mandarin.) Flowers of a deep orange color shading almost to crimson. Dwarf. Compact habit.
White Mignonette. (Reseda alba.) Long spikes of white flowers. Very free flowering. Robust habit. 2 ft. Very useful for summer cutting.
Sunflower. (Starlight.) Flowers canary yellow. Petals twisted very prettily like a Cactus dahlia. Useful as a border plant or for cut flowers. A valuable addition to our hot weather flowers.

GLADIOLI.

In a test extending over a period of three years of about two hundred named varieties of these popular flowers, the following have been selected as being the best twenty-five kinds for the amateur grower. The choicest of these are marked with an asterisk to make a list of one-dozen.

**Afterglow.* Salmon fawn shade, with pale blue centre. Large flowers. Massive spike.
**America.* Pale delicate pink. Large flowers. Strong habit.
**Augusta.* White with blue anthers. Large spike. Lateral spikes well developed.
Attraction. Deep rich crimson. White throat. Medium grower.
Baron Joseph Hulot. Deep violet blue. Medium flower.
**Blue Jay* (Groff). Purplish blue with lighter shadings.
Brenchleyensis. Bright scarlet. Large spike. Strong grower.
**Dawn* (Groff). Pale salmon shaded lighter, suffused with carmine or claret on inferior petals.
**Evolution.* Delicate rose shaded darker. Attractive.
**Eugene Scribe.* Pale rose shaded carmine. Good habit.
George Paul. Deep crimson shaded yellow, spotted violet-purple.
Giant Pink. Deep rose pink with markings of deeper pink. Strong grower.
Jane Dieulafoy. Creamy yellow, blotched crimson.
Lady Howard de Walden. Bright yellow, inferior petals flaked with carmine.

La Luna. Creamy yellow, heavily blotched with chocolate carmine.
Little Blush. Creamy white shaded yellow, heavily striped and shaded yellow.
Meadowvale. Almost pure white, slightly shaded crimson and pink,
Peace. White, slightly suffused pale carmine. Large spike. Very conspicuous.
Philadelphia. Deep pink, shaded and diffused lighter. Strong grower.
Princeps. Bright red. Lower petals streaked and blotched lighter.
Prophetesse. Pearly white with maroon blotch. Round, compact flower.
Rosella. Light rose shaded purple and white. Large flower.
Scarsdale. Lavender. Strong grower.
Victory. Bright yellow. Large spike and flower.
Wm. Falconer. Creamy rose shaded and spotted red and carmine.

Out-door Hardy Roses.

About one hundred kinds were added last spring to the collection of roses planted in 1907, which now makes the collection fairly representative of these popular flowers. Many of those planted last spring flowered during the summer, but as yet they have not been sufficiently tested to warrant publishing results as to their suitability for general planting. Those planted out in 1907 have done well the past two seasons and were greatly admired by our summer visitors. After two season's tests the following can be recommended as most desirable for garden roses:

Bush Roses:
Alfred Colomb. Reddish crimson.
Anna de Diesbach. Silver pink.
Baron de Bonstetten. Dark crimson.
Dinsmore. Dark crimson.
Earl of Dufferin. Purplish crimson.
Eugene Furst. Velvety crimson shaded maroon.
Frau Karl Druschki. White. A continuous bloomer.
General Jacqueminot. Scarlet crimson.
John Hopper. Rosy pink.
Mount Carmel. Deep reddish pink.
Oakmont. Silvery pink.
Paeonia. Bright crimson.
Moss Roses:
Blanche Moreau. White.
Crimson Globe. Crimson.
Princess Adelaide. Pink.
Rugosa Roses:
Agnes Emily Carman. Crimson. Semi-double.
Rosa rugosa. Crimson. Single.
Rosa rugosa alba. White. Single.
Climbing Roses:
Crimson Rambler. Crimson double.
Dorothy Perkins. Pale dainty pink.
Queen Alexandra. Pale pink.
Wm. Egan. Pale pink.

Of the more tender species of roses, such as Hybrid Tea, Tea Scented or Ever Blooming, and the dwarf Polyantha roses, very few of those tested have given good results even with extra protection and care during the winter. The high altitude and the exposed position of our grounds are doubtless the causes of failure. The only two varieties that have given really good results are Hermosa, a soft pink rose of the Bourbon type, and the Baby Rambler, a bushy, dwarf growing variety similar in color and flowering habit to the Crimson Rambler. Both Hermosa and Baby Rambler gave a splendid succession of bloom from July until early in October. Tests are being made with a number of the Rambler roses to determine their suitability for general planting.

Respectfully submitted,

H. L. HUTT

PART XIV.

THE PROFESSOR OF POULTRY HUSBANDRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Poultry department for 1909.

Teaching scarcely needs a detailed report. The work has been much the same as in previous years, that is, lectures to the regular College students, Short Course students, Poultry Institutes, Farmers' Institutes, etc.

This has been one of the most successful years in the history of the department. We have been able to raise more and better stock than in previous years. Not only has the stock been healthier, but it has grown larger, matured earlier, and is of better quality from the show-room standpoint. A few fair show birds are required for class-room work. We do not pretend to make a specialty of breeding exhibition stock, but we are trying to breed birds that will yield a profit by their eggs or flesh production and at the same time be fair representatives of their breeds.

The great majority of our people are interested in the hen that lays rather than in a bird valued for its beautiful form or plumage. I believe that the beauty of a bird need not detract from its power to produce either eggs or meat, and we hope in time to breed much better color in some of the families that are deficient in this respect, but are good layers or meat producers.

We can house comfortably about eight hundred birds. This allows us to use Houses Nos. 1 and 2 largely for class-room work—each pen having a different variety. The birds are also used for pen practice by the Short Course students. The balance of the houses are used almost entirely for experimental purposes, either in breeding, feeding or as to design of houses suitable for this climate. This branch of the work grows from year to year and I have no doubt that in the near future we shall be asking for more houses to test problems in the various lines as they present themselves. There appears to be endless work ahead; the trouble is to know which problem to attack.

HOUSES.

For five years we have been working with four designs of houses which have been described in previous reports, and also in Bulletin 151. The results each year point in no unmistakable manner to the necessity of an abundance of fresh air in the house, and, moreover, that there shall be no direct drafts across the birds. The warm, well built, tight house has not given satisfactory results in any winter. This house no doubt could be managed to give better results by leaving the door or a portion of the windows open, but if so managed it would then be similar to the single ply board houses as far as temperature was concerned. I think we have fully demonstrated that elaborate, expensive houses are not an essential for a good egg yield in winter. Cold air, if the house is dry and free from drafts, is not a serious detriment. One of the houses has been as low as 7 degrees below zero in the centre of the building.

The following record shows in a concise form the difference in the percentage of egg production in favor of the cold or fresh air house during the five years

for the months of December, January, February and March, the first year beginning December, 1904-05, 76 per cent.; 1906, 8 per cent.; 1907, 11.8 per cent.; 1908, 15.6 per cent.; 1909, 12.4 per cent.

The house with a cloth front and the one with movable windows compare favorably with the cold houses. There is probably not enough difference in the actual egg production to warrant a statement that either of these houses is very much inferior to the cold house. They are about 3 degrees warmer than the coldest house and about 15 degrees colder than the warm house.

Large or Small Flocks in a House.

For three years we have been comparing flocks of 50 and 100 with the same floor space per bird. Our results are in favor of the smaller flock. No doubt an expert can get very good results from flocks of one hundred, but the ordinary attendant will do better with two flocks of fifty each.

We are working with some low down movable houses that will accommodate 15 to 20 birds. These have nearly one-half the south side covered with nothing but wire netting. They worked well last winter, possibly with a good cold, stormy winter the results might be different.

Late or Early Hatched Pullets.

The large and small flock test above was made with pullets. We were fortunate in having April and June hatched pullets of exactly the same breeding so that we could make a comparison of egg production as influenced by age. The records were kept from Nov. 1st to July 1st. The April pullets averaged 77 eggs each, while the June pullets laid but 48 each. The June pullets laid no eggs before January. The feed cost 70 cents per bird for the above period, which means that the eggs from the April hatched pullets cost 12 cents per dozen while those from the June hatched pullets cost 17.5 cents.

A Small Profitable Flock.

A number of inquiries are received each year as to what it costs this department to keep a hen for a year and as to how many eggs she lays, etc. To answer in a general way these inquiries the experiment as given below was conducted.

Stock. Twenty-five May hatched White Wyandotte pullets and two males were used in this trial. There was no particular reason why we did not use some other breed. These birds were used largely because they were nearly of the same age; they represented at least three families of the breed and were hatched about the same season of the year when most farmers hatch their chickens. They were well grown on what might be called free range, that is, in the College orchard, and were moved into winter quarters about Oct. 15th, 1908. The experiment began November 1st, and was continued for one year.

Housing. The house used was not an expensive one, nor yet was it new. I do not know the exact age of the building, as it was constructed before I was given the management of the department. The ground surrounding the building has had fowl upon it for at least twelve years. No advantage, whether real or apparent, can be charged against these birds, for new ground, new buildings, or expensive building. The house is 10 feet wide by 14 feet long; is 4 feet high at the eaves and is seven feet high in front. It is built of single ply boards, the cracks between the boards being covered with battens. A rough manure shed was built in front

of the house as a feeble imitation of a farm barnyard. We found it necessary to cover the shed on account of the snow. The shed was constructed of old rough boards and was not tight—the wind could blow through quite freely. The floor of this shed was covered to a depth of about one to two feet with horse manure. Some fresh manure was added every week or so, and about an equal amount taken away. We hoped the birds would exercise themselves out in the shed, but in this respect it was not a success. I doubt very much if there was any advantage with the shed except an abundance of fresh air and more room in which to move about. The yard surrounding the house is well sodded and is practically 60 feet square.

Feeding. During the winter, grain was fed in deep straw litter in the morning and usually in the evening. About twice a week during the winter some wet mash was given at night in place of the whole grain. Clover hay was always available from the rack in one corner of the pen, as was also grit and oyster shell. Roots were given once or twice a week during the winter when we could get them, probably a bushel would be all this pen had. Cooked meat was fed a few times at noon, as was also cut green bone. For most of the year a hopper of beef scrap was constantly available. This was closed when either meat or bone was fed, or when milk was given to drink, as was done during the hot summer months.

The feed consisted mostly of wheat and corn with some oats. The mashes were made of bran, shorts, oat chop and corn chop; in some instances, barley or buckwheat chop was used or we used what we had, only that we tried to have at least some bran and middling in all mixtures.

Feed Consumed and Value According to Local Markets.

Feed.			Value.
Corn,	256 lbs.	at $1.60 per cwt.	4 10
Wheat,	563 "	at $1 per bushel	9 39
Mash,	220 "	at $1.50 per cwt.	3 30
Mixed Corn			
Wheat,	347 "	at $2 "	6 94
Meat food,	117 "	at $3 "	3 51
Milk,	700 "	at 20c "	1 40
Roots, Hay, Oyster shell, etc. (estimated)			1 00
Total cost			$29 64

Mixed grain was fed during the summer when wheat was worth $1.30 per bushel, hence the charge of two cents per pound.

Eggs Laid and Value According to the Local Market.

Month.	Number.	Price per doz.	Value.
			$ c.
November	17	.30	0 43
December	95	.36	2 85
January	358	.36	10 74
February	280	.30	7 00
March	320	.24	6 40
April	377	.18	5 51
May	311	.18	4 67
June	377	.18	5 51
July	304	.24	6 08
August	266	.24	5 32
September	194	.24	3 98
October	154	.30	3 85
Total			62 34

There yet remains at least one item that must be considered, and that is, the number of birds that have died. In this particular pen the death-rate has been very high—a total of five birds. Of the five, three died in the nest laying, one in May, one in June and one in August. In this house we used trap-nests and the birds may have suffered from being left in the nest too long during very warm days. To me the most interesting part of this experiment is the cause of the deaths. When we examine the egg record we find the deaths occurred among the birds that were slow in starting to lay—two of them not laying until after the middle of March. To the ordinary poultryman this result would have been more or less expected, as he is aware that where pullets have all they want to eat during the winter, a few non-producers will get overfat, as indicated by the large development of fluff. Such birds should be sold to market as they seldom make fair layers. One bird laid but 19 eggs before she died, and 56 was the most laid by any of the others. I believe these hens ate too much meat and beef scrap. We wanted them to have the opportunity to eat all they would. The results were satisfactory as far as the producers were concerned, but the pullets that failed to lay during the winter were very fat. Many of the heaviest layers were rather too thin. A feeder with but one flock has at times to sacrifice a few for the many.

There are practically 24 months of feeding for one bird lost by the death of five hens, hence our feed bill for the twelve months represents practically the feed of 25 birds for the year.

The value of the five birds lost should be charged against the pen. Whether one should charge in this particular instance, the labor, rent of land and house is debatable.

Financial Statements.

Cost of Foods	$29 64	
Loss of 5 hens at 50c. each	2 50	
Value of eggs		$62 34
Profit	$30 20	

A further analysis shows the following:

Grain consumed per bird.....55.5 lbs.	Four birds laid more than .....200 eggs
Grain cost.....94.12 cents.	Nine birds laid less than .....100 "
Animal food cost.....19.64 "	
Average laid per bird .....122 eggs.	Average profit per hen $1 20

No charges have been made for labor, and no credit for manure.

Hatching and Rearing.

The new incubator house has been very useful to us during the past year. We have been able to hatch more chickens with less labor, and moreover, the death rate among the chicks was not so large as in previous years. Just how much of this is due to ventilation of the incubator house is very hard to determine. The loss from all machines, including the numerous experimental operations, was a trifle over 30 per cent. This, of course, is much higher than we would like, but, nevertheless, is perhaps near the average commercial plant.

We have not as yet been able to find any method by which we can always avoid the so-called "White Diarrhœa" disease. We have this season, as in past years, gotten our best chicks from machines washed with a ten per cent. solution of a tarry compound. This is done immediately before the eggs are put in the machines.

A number of operators have reported very satisfactory results from the above treatment, but at the same time there have been a few failures, possibly due to the fact that there appears in some instances to be more than one organism to deal with.

There can be no doubt that much can be gained from breeding from but the strongest and most vigorous stock, and in addition, one should breed only from well matured birds. The stock, the feed, the housing, etc., are factors which must be as nearly ideal as possible in order to get good hatches and low mortality.

The past season with us was unusual in that eggs set during January hatched exceptionally well, even when all the machines were operated by students. The average hatch was nearly fifty per cent. of the eggs set. Eggs set during March and early April did fairly well, but eggs laid from April 15th to May 15th were not nearly as good for hatching as we usually have them. The late season and long confinement were, in a measure, weakening to the birds.

To rear good chickens at a reasonable cost is within the reach of every farmer. We find that we can grow a chicken very easily if raised upon the farm or what is termed free range. The colony houses are placed in the orchard, pasture field, and corn fields. If the birds are not too crowded on the land, they do but little damage to the crops and no doubt do much good in the way of destroying insects. We have not as yet, under above conditions, put more than one thousand chicks on fifteen acres of land. This gives the birds plenty of range over fresh ground and moreover, reduced the labor of caring for them. After the chicks are about six weeks of age they are fed entirely from hoppers or boxes. These are large enough, or in sufficient numbers, to hold a week's feed. The water is supplied by the barrel so that we have to feed, water and clean the houses but once each week. We have not as yet been able to avoid the necessity of shutting the houses each night. There are so many animals prowling around at night that we cannot leave any houses or coops open. We find the colony house much more convenient for shutting at night than the small coop for a hen and chicks, for the reason that it takes no more time, if as much, to shut a hundred birds in a house than it takes to securely fasten fifteen in a little coop.

The method of feeding adopted is very simple. When chicks are put in the brooders, whether hen or incubator hatched, we try to give them new milk to drink for the first week. We cannot always do this, but it starts them better than water and often saves some of the tardy ones who hardly know what or how to eat.

The feeds used are cracked wheat, cracked corn and pinhead oatmeal in equal proportions. A dry mash of bran, corn-meal, low grade flour and middlings is fed after the chickens are a few days old. They like this mash very much and would probably eat too much if left constantly before them. We usually add, say a teacupful of powdered charcoal to a gallon of the mash. The chicks are fed five times daily until two weeks old, then three times until about six weeks, after which they are fed from hoppers. This method is for late March, April and early May birds. Those hatched later when they can run out of doors practically all the time, are fed from the hoppers from the first feed.

Cost of Rearing.

We were able this season to keep an exact record of the birds grown in the pasture field and of those grown in the orchard. The chickens in the pasture field were hatched during the first two weeks of May. Three hundred and forty-five birds were grown to maturity or a size suitable for fattening. We began to remove the cockerels from the field to the fattening pens August 25th. The pullets and

cockerels held as breeders were all taken from the field by 22nd of October. The breeds reared were Orpingtons, Wyandottes, Plymouth Rocks, Leghorns, etc. They consumed 4,304 lbs. of grain; of this, about one-third would be dry mash, nearly 300 lbs. of chick food and the balance of wheat, corn and hulled oats in the proportion of 2½, 2 and 1. There was five per cent. of beef scrap added to the dry mash. The birds were weighed when taken from the field, weighing 1,341 lbs., or a pound of chicken represents 3.2 lbs. of grain. Some of the breeding cockerels weighed over seven pounds and the Leghorn pullets did not average three pounds in weight. We removed most of the cockerels at about a three and one-half pound weight or when they would fatten most economically.

The chickens reared in the orchard varied more in ages. The first were hatched the 25th of April, and the last, July 6th. Most of the birds were hatched in May. We sold 218 as broilers from this lot during July. The later cockerels were removed to the fattening crates as was done with those grown in the pasture field. Most of the pullets were taken out about the first of October and by the first of November practically all had been removed with the exception of about one hundred—these were cockerels held as breeders and the July chicks.

We raised in this field 773 chickens at a cost of 8,649 lbs. of grain. A pound of chicken equals 2.34 lbs. of grain, or nearly the same as the pasture field chickens.

The figures mean that a farmer can in his fields raise a four-pound cockerel for thirteen of fourteen pounds of grain. This amount of grain at thirty dollars per ton, would be worth twenty-one cents. The cockerel would sell in the market for at least forty cents, and if fattened would be worth sixty cents. The data we have on hand would indicate that it costs about five to seven cents each to hatch the above birds, that is, figuring eggs, oil and losses.

Needs of the Poultry Department.

If we are to continue the work already begun in breeding for heavy egg production, hatching quality eggs, etc., which are of vital importance to the industry, we shall require more assistants, as the mass of record keeping, etc., is much more than we can now attend to properly, to say nothing of the growth from year to year.

Respectfully submitted,

W. R. GRAHAM.

PART XV.

THE PROFESSOR OF FIELD HUSBANDRY AND DIRECTOR OF FIELD EXPERIMENTS.

To the President of the Ontario Agricultural College:

SIR,—It is my pleasure to submit to you the report of the work done in the department of Field Husbandry for the year 1909. The work of the past year has been carried forward with energy, and the results, on the whole, I consider very satisfactory. The students of both the long course and the short courses have

A partial view of the Experimental Grounds in 1909.

shown a deep interest in the work in the class-room, the laboratory and the field. The experiments in Field Husbandry at the College have been conducted along many important lines, and the co-operative work throughout Ontario has been more extensive and valuable than in any year previous. That there is a deep interest shown by the farmers of Ontario in the work of the department of Field Husbandry is manifest from the fact that very large numbers visited and examined the experimental plots during the summer season, and that the inquiries made through correspondence have been unusually large. The requests from various Ontario organizations to assist in conducting short courses, in delivering lectures, and in judging at fall fairs, seed fairs and larger exhibitions have been so great during the past year that, while we have complied with many, we have been unable to respond to all of these numerous invitations.

OUTLINE OF WORK DONE DURING THE YEAR.

In order to give more definite information regarding the various requirements of the department of Field Husbandry, the following concise outline of the work of the past year is here presented:

1. Delivering lectures and giving demonstrations before the classes in the regular course at the College, as outlined in the College Calendar.

2. Delivering nine lectures before the students in the short course in Seed and Stock Judging, eighteen before the students from the Ontario Normal Schools, and four before the Public School teachers attending the summer course in July.

3. Conducting experiments in Field Husbandry on fully 2,000 carefully measured plots at the Agricultural College.

4. Improving the leading varieties of cereal crops by means of systematic selection and by cross-fertilization, there being 123,852 hybrid plants grown separately in the experimental grounds in 1909.

5. Explaining the experiments in Field Husbandry to thousands of farmers, members of the Toronto branch of the Canadian Club, members of the Press Association, and numerous persons connected with agricultural colleges, experiment stations, seed firms, etc., coming from near and far, and visiting the College and inspecting the experimental grounds in the summer season.

6. Conducting co-operative experiments on 4,856 farms throughout Ontario,

An excursion party visiting the experimental plots.

Results of the successfully conducted experiments will be found in the Annual Report of the Ontario Agricultural and Experimental Union.

7. Writing agricultural reports and bulletins, including the report of the department of Field Husbandry at the College, the Report of the Co-operative Experimental Work throughout Ontario, and the articles which are sent to the farm journals and newspapers throughout the year.

8. Carrying on a very large correspondence with farmers, seedsmen, fertilizer manufacturers, experiment station officers, and others throughout the entire year. At some seasons, the letters received number about two hundred per day.

9. Delivering addresses at various gatherings of farmers and others throughout Ontario, as follows:

By the Writer. One at the Canadian Club, Toronto; three at the Ontario Agricultural and Experimental Union, Guelph; one at the Ontario Fairs Association, Toronto; one at the Annual Meeting of the Ontario Corn Growers' Association, Essex; one at the Seed Fair, Haliburton; one at the Farmers' Club, Preston; and one at a complimentary luncheon given at the City Hall, Guelph, in connection with

the Winter Show. Besides these, the writer delivered one address before the annual meeting of the British Association for the Advancement of Science, Winnipeg; one address before the American Breeders' Association, Columbia, Mo.; one address before the State Corn Growers' Association, Columbia, Mo.; and one address at the annual banquet at the State University, Columbia, Mo.

J. Buchanan. Two at the Farmers' Institute meeting at Appin, two at Glencoe, and two at Wardsville; one at the annual meeting of the Farmers' Institute at Brigdon, one at Appin and one at Sutton West; one at a meeting of the Farmers' Club, Galt; one at the Winter Fair, Guelph.

W. J. Squirrell. Two addresses at the Farmers' Institute meeting at Rothsay, two at Palmerston, two at Mount Forest, two at Kenilworth, two at Conn, and two at Cedarville; and one at the Farmers' Institute meeting at Alma; one at the annual meeting of the Farmers' Institute at Owen Sound and one at Bel-

The judges of standing field crops having a practical test at the College before starting to judge crops throughout Ontario.

wood; two at a meeting of the Farmers' Club at Laskay; and one at each of the Seed Fairs of Fergus and Elora.

A. W. Mason. One address at the Seed Fair at Mount Forest and one at Mitchell.

C. R. Klinck. Two addresses at the Farmers' Institute at Ravenna, and one address at the Seed Fair at Richmond Hill.

10. Judging grains, etc., as follows:

By the Writer. The Provincial Winter Fair, Guelph, and the Spring Seed Fair, Guelph.

J. Buchanan. Canadian National Exhibition, Toronto; Fall Fair, Essex, and Winter Fair, Guelph.

W. J. Squirrell. Seed Fairs at Elora and Fergus, and Fall Fair at Guelph.

A. W. Mason. Seed Fairs at Mount Forest and at Mitchell, and the Fall Fair at Simcoe.

C. R. Klinck. Seed Fair at Richmond Hill.

A. E. Whiteside. Autumn Seed Fair, Guelph.

11. Conducting short courses in Seed Judging, as follows:

By the Writer. Lindsay, Victoria Co.; Ayr, Waterloo Co.; Carleton Place, Lanark Co.; Picton, Prince Edward Co.; and Hickson, Oxford Co.

J. Buchanan. Creemore, Simcoe Co.; Alliston, Simcoe Co.

C. R. Klinck. At the following places in Prince Edward Island: Malpeque, Tyne Valley, Springfield, Georgetown and Tracadie Cross.

12. Inspecting different sites for the new Central Prison, and reporting on the same, at the special request of the Provincial Secretary.

13. Furnishing plans, seeds and instructions for demonstration plots at the exhibition grounds at Simcoe; and assisting in various ways, and furnishing seeds and instructions to the county representatives of the Ontario Department of Agriculture.

14. Fulfilling the duties required of the Secretary of the Ontario Agricultural and Experiment Union, the Vice-President of the Canadian Seed Growers' Association, the Chairman of the committee on breeding cereals of the American Breeders' Association, the Secretary-Treasurer of the Macdonald Consolidated School, a member of the programme committee of the American Society of Agronomy, a member of the seed committee of the Ontario Provincial Winter Fair, etc.

I take this opportunity of expressing my great appreciation of the excellent services rendered by the efficient and willing staff of workers in my department. Mr. John Buchanan, B.S.A., lecturer in Field Husbandry, has taken a greater part of the lecturing in connection with the regular college course. He has also conducted the greater part of the examinations during the past year. Mr. W. J. Squirrell, B.S.A., has done excellent work, especially in the taking of notes in the Experimental Department, in the preparation of material for the reports, in imparting information to the farmers when visiting the College in excursion parties in the month of June, etc. Mr. A. E. Whiteside, who has been foreman of the department for more than a dozen years, has had charge of the men and the students when at work in connection with the various experiments, and has also given excellent assistance in planning experiments and in making careful records of the same. Mr. C. R. Klinck, B.S.A., and Mr. A. W. Mason, B.S.A., have devoted nearly the whole of their time to the work in Plant Breeding, which is now being developed to such a large extent, and from which we hope to obtain results of much importance. Miss J. I. Coxon has been not only accurate and painstaking in her duties as stenographer, but has always been very obliging and deeply interested in her work.

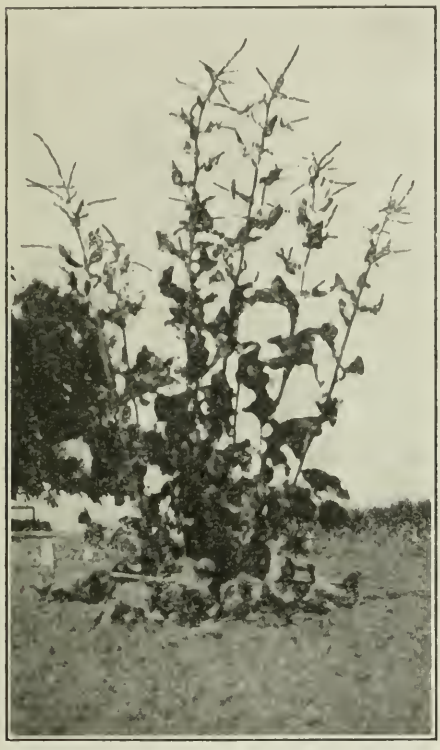
Outline of the Experimental Work in Field Husbandry.

About fifty acres of land, divided into upwards of 2,000 plots, are used for experiments conducted with varieties of grain, root, tuber, grass, clover, fodder, silage, and other crops; with artificial, green and barnyard manures; with methods of cultivation, selection of seed, dates of seeding, etc. All of these experiments are conducted with the greatest care, and for several years in succession in order to secure strictly accurate results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario.

The grounds have a gentle slope towards the southwest, and the soil is an average clay loam. About one-quarter of the land is manured each year with twenty tons of farmyard manure per acre; thus most of the land receives an application of farmyard manure once every four years. No commercial fertilizers are

used except in distinct fertilizer experiments, and these occupy only a small number of plots each year. Within the past twelve years one green crop has been plowed under on each section of the field. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yields of the plots in every instance.

The work in the Experimental department consists in planning the various experiments; laying out, seeding, and looking after the field plots; harvesting, threshing, weighing and testing the grain; taking up, weighing, counting, testing and storing the potatoes and roots; cutting, weighing and harvesting the grass, corn



A plant of mangel seed.

A carrot plant producing seed.

and fodder crops, etc., and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year and some to be distributed for co-operative experimental work throughout Ontario. A great deal of thought and care is required in planning, supervising and examining these plots, and in studying, comparing and summarizing the results for presentation in reports, bulletins, newspaper articles, and lectures.

Results of Experiments.

All of our field experiments are conducted for at least five years before conclusions are drawn, and many of them are continued for a much longer period of time. For the results of some of the tests which were carried on for five or more

years previous to 1909, the reader is referred to former reports. The results of some of the experiments which have as yet been conducted for only one or two years, are held over until the tests can be carried through for at least another summer. As different seasons vary so much in temperature, rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one or two years' work. Owing to the great care exercised in the work and the number of years through which the experiments are continued, we are able to present the results with much confidence in their reliability and in their practical value. From year to year the reports of the experimental work are being more widely read and more carefully studied by the farmers of the Province, and this is leading to a greater interest in crop production and a deeper knowledge of plant life on the farms of our country.

Weather Conditions in 1909.

In order to better understand the results of experiments with field crops conducted at the College, it is important to have a knowledge of the weather conditions of the different seasons during which the experiments have been conducted. In each of the past ten years, careful records of the rainfall have been kept in connection with the Physical department of the College. The following table gives the total amount of precipitation in each of the six months of the growing season in each of the past ten years, as recorded at the College.

Month.	Amount of Precipitation During the Six Growing Months.										
	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	Average 10 years.
April	1.69	2.24	2.43	2.69	2.10	1.82	1.44	1.66	1.33	3.60	2.10
May	1.03	3.26	1.67	2.44	3.01	3.89	2.71	2.64	3.47	3.43	2.76
June	4.47	1.53	3.06	3.05	2.86	3.24	4.06	1.11	3.21	1.33	2.79
July	3.05	4.07	6.43	2.67	4.99	4.60	4.65	1.92	3.25	4.54	4.02
August	.87	3.51	2.18	3.47	3.88	1.98	2.13	.62	2.75	89	2.23
September	1.52	2.45	3.58	1.48	2.80	2.85	2.49	2.87	.73	.86	2.16
Total	12.63	17.06	19.35	15.80	19.64	18.38	17.48	10.82	14.74	14.65	16.06

From the table here presented, it will be seen that the amount of rainfall in April of the present year was 3.6 inches, which was considerably greater than that in any April in at least nine years previous. Owing to this large amount of rainfall in the month of April and the unusually cool weather, the seeding was greatly retarded, the land in the experimental plots being unfit for cultivation until nearly the end of the month. The unusually cold, wet, backward season was apparently general throughout the Province of Ontario, and therefore the conditions at Guelph would be quite representative for Ontario for the present year. In the month of May there was also about two-thirds of an inch of rainfall more than the average for the same month during the ten year period. The amount of rainfall for the month of June was unusually light and that for July unusually heavy. The rainfall in August and in September was very small indeed, there being less than an inch in either of these two months. The total precipitation for the six months was 14.65 inches. This was about an inch and a half less than that for the average of the ten year period. It will therefore be seen that the weather conditions of

the past summer have been somewhat unusual. In spite, however, of the cold, wet spring, and the small amount of rainfall in August and September, the yields from the farm crops were, in most cases, fairly good. The experiments with farm crops during the past year will be specially interesting in showing results obtained in a season somewhat out of the ordinary and in a comparison of these results with the average of those for a series of years.

Farm Crops in Ontario.

If it is true that the output of the Ontario farms has practically doubled within the last fifteen or sixteen years, there are causes for this tremendous increase. Is this great increase owing to the improvement in the climatic conditions of Ontario, or is it largely due to the introduction of better methods of farming and of better varieties of farm crops? The work of the Ontario Agricultural College is more closely associated with this increase in agricultural production in Ontario than many people realize.

Loading Alfalfa in a thirty-acre field on the College farm.

The most extensively grown variety of barley and the second most extensively grown variety of oats in Ontario during the past few years were imported, tested and distributed by the Ontario Agricultural College. The variety of winter wheat which is now grown more extensively than any other variety of winter wheat in Ontario, was practically unknown to the Province until it was tested here and distributed through the medium of the Experimental Union. The average annual increase in yield of grain per acre for the whole of Ontario during the last twelve years, as compared with the twelve years previous, has been 11.3 per cent. in winter wheat, 15.1 per cent. in oats, and 22.7 per cent. in barley. The increase for the oats alone amounts, on the average, to $11,029,258 annually. In the last twelve years, the market value of the barley of Ontario has increased from $3,245,880 to $10,943,788. During the last five years, the market value of the barley grown in Ontario was greater than that from the years 1885 to 1889, which was at the time that barley was grown extensively and shipped to the United States, and previous to the high tariff which stopped the export of the barley from Ontario to the American Union. It is exceedingly gratifying to realize that the average yield per

acre of some of the principal farm crops is now increasing from year to year. There are yet exceptionally fine opportunities and almost unlimited possibilities for the agriculture of Ontario.

Any person who makes a study of our agriculture and its possibilities, cannot help but realize that the young men of our Province have plenty of room for their best thoughts and their deepest study in their endeavors to become good farmers in the highest sense of the term. The fertility and the cultivation of the soil, the ripening and the storing of the crops, the selection and the preservation of the seed, the feeding and the care of the farm stock, the breeding of the plants and the animals, and many other problems of great value and intense interest, require not only a practical training in the operations of the farm, but also a good knowledge of the underlying principles of agriculture, and exceedingly good judgment in the application of those principles to the various operations on the farm. Even the most common plants and animals and the most humble operations on the farm are worthy of the best thoughts of the best men. In order to know which are the most valuable classes of crops to grow to meet the various requirements, the most desirable varieties of each class to furnish the largest amount of food of the best quality, the most suitable time and method to sow each variety to use advantageously the fertility and the moisture in the soil, etc., are all questions of the utmost importance for every farmer to determine for himself. In this work, however, the department of Field Husbandry at the College is in a position to give a large amount of valuable assistance.

It will be perceived that slight mistakes in the selection of the most suitable crops for growing in various localities, while they may not prove disastrous, may

A field of the O. A. C. Number 21 Barley on the College farm.

easily result in considerable loss to the individual farmer. Careful thought should be given to this phase of the question of crop production. The selection of crops is necessarily governed to a considerable extent by the location of the farm, the quality of the soil, the particular kind of farming which is followed, etc. It is therefore to the interest of every individual farmer to study these things out for himself when determining the kinds of crops which are likely to give the best satisfaction under his own particular circumstances.

As a general rule, farmers know that oats will yield more bushels per acre than barley, and that barley, in turn, is likely to yield more bushels per acre than wheat, but a bushel is a bulk measure and not a weight measure, and the weight of grain produced per acre is of much greater importance than bulk. It is both interesting and instructive to compare the results of the various crops grown in Ontario under similar standards of measurement. The following table, which has been compiled from the reports of the Bureau of Industries, gives the average yields for twenty-seven years in both bushels and pounds per acre of the grain crops, and of bushels and tons per acre of the root crops, as grown on the farms throughout Ontario.

	Yield per acre.	Yield per acre.
GRAIN :—	Bus.	Lbs.
Barley	27.7	1330
Winter Wheat	20.7	1242
Oats	35.7	1214
Peas	19.4	1164
Beans	17.1	1026
Spring Wheat	15.9	954
Buckwheat	19.8	950
Rye	16.4	918
FIELD ROOTS :—		Tons.
*Mangels	460.0	13.80
Turnips	429.0	12.87
*Carrots	346.0	10 38

*Average for twenty-six instead of for twenty-seven years.

A field of the O. A. C. Number 21 Barley on the College farm.

It will be observed that for the whole Province of Ontario and for a period of twenty-seven years, the annual yield of barley per acre has surpassed that of winter wheat by 88 pounds and of oats by 116 pounds. It will also be observed that the mangels surpassed the turnips in average yield per acre by 31 bushels or almost 1 ton.

At the College, particular attention has been given to a study of the different classes of farm crops by making use of a leading variety in each class. One of

these experiments was started in 1902 and was conducted in duplicate each season for six years in succession. In each of the six years, twelve varieties of farm crops were grown in duplicate, making in all twenty-four plots in the experiment each season. In the spring of 1907, another experiment made up of eight different classes of farm crops was conducted in duplicate, and therefore occupied sixteen plots. This experiment was repeated in the same way in 1908 and again in 1909. The following table gives the average results of the twelve tests made during the six years, and of the six tests made during the three years in date of ripening, length of plants, percentage of rust, percentage of crop lodged, and of yield in tons of straw and in pounds of grain per acre:

Varieties.	Date of Ripening.	Length of Plants.	Percentage of Rust.	Percentage Lodged.	Straw per Acre.	Grain per Acre.
Average results for 6 years, 1902-7.		Ins.			Tons.	Lbs.
Emmer (Common)	Aug. 17	39	4	36	2.2	2,756
Barley (Mandscheuri)	" 4	40	5	39	1.9	2,715
Oats (Joanette)	" 14	38	7	41	2.7	2,559
Hulless Barley (Black)	" 4	31	8	40	2.0	2,527
Early Oats (Wild Goose)	" 7	41	10	53	2.1	2,395
Hulless Barley (White)	" 7	33	6	59	1.9	1,992
Spring Wheat (Alaska)	" 24	47	9	16	2.4	1,905
Spring Rye (Common)	" 14	53	4	21	2.1	1,780
Field Peas (Early Britain)	" 21	44	.....	.....	1.7	1,772
Flax (Common)	" 15	28	.....	14	2.0	1,100
Grass Peas (Common)	Sept. 8	50	.....	.....	2.2	753
Vetches (Common)	" 2	34	.....	.....	1.6	595
Average results for 3 years, 1907-9.						
Emmer (Common)	Aug. 15	36	2	12	1.8	2,696
Oats (Banner)	" 17	44	6	21	1.9	2,606
Barley (Mandscheuri)	" 5	32	2	5	1.5	2,591
Hulless Barley (Guy Mayle)	" 3	23	5	15	1.4	2,344
Spring Wheat (Wild Goose)	" 23	43	4	1	2.2	2,154
Field Peas (Early Britain)	" 18	36	.....	.....	1.3	2,145
Spring Wheat (Red Fife)	" 22	40	5	11	1.8	1,795
Spring Rye (Dakota Mammoth)	" 13	51	3	5	1.8	1,674

In the average results of the one experiment for six years, as well as in the average results of the other experiment for three years, it will be seen that Emmer gave the largest yield of grain per acre, in the former experiment, the yield being 2,756 pounds and in the latter 2,696 pounds. A slight change has taken place between the relative positions of the barley and oats in the two different experiments; in the former the Mandscheuri barley surpassed the Joanette oats by 156 pounds of grain per acre, while in the latter the Banner variety of oats surpassed the Mandscheuri barley by an average of 15 pounds of grain per acre. It must be remembered that the latter experiment is just under way and will be continued for two or three years before it is really completed. Although in this experiment the Banner oats gave 15 pounds of grain per acre more than the Mandscheuri barley, it should be noted that the Banner oats has, on the average, about 32 per cent. of hull and the Mandscheuri barley about 15 per cent. of hull. The Hulless barley occupies fourth place in each experiment. A comparison between the results of the farm crops as grown throughout Ontario and those grown at the Agricultural College, forms a study

of much interest and provides data of considerable importance. The fact that Emmer has taken the lead in the production of grain in the average results of both the experiments at the College speaks well for this new introduction into Ontario. For fuller information and more detailed results regarding the Emmer and other classes of farm crops mentioned in the accompanying table, the reader is referred to experiments enumerated throughout this report.

Co-operative Experiments with Farm Crops Throughout Ontario.

Our system of co-operative experiments throughout Ontario has been an exceedingly important feature of the College extension work for nearly a quarter of a century. The work is carried on through the medium of the Ontario Agricultural and Experimental Union. It is exactly twenty-four years since the present system was started in a small way. From the beginning it has gradually increased in extent and in influence throughout the Province. We have now hundreds of men throughout Ontario who have successfully conducted experiments on their own

Sowing some of the experimental plots.

farms for five years or more, and some of them have conducted successful work from twelve to fourteen years.

In 1909, co-operative work was conducted on farms throughout Ontario in Agriculture, Horticulture, Forestry and Poultry Raising, and in connection with the public schools in Elementary Agriculture, Horticulture and Forestry. Although some work in connection with the schools had been conducted in previous years, it was not until 1909 that this branch of the work was placed under a separate committee. We are pleased to state that the work in connection with the schools has been largely increased this year, and we believe that there are excellent opportunities for great development along this line.

The co-operative work in Agriculture has been conducted for a longer time than that of any other department. The number of co-operative experiments for the twenty-four years from 1886 to 1909 inclusive, is 54,345. In agriculture alone, definite experimental work was conducted on measured plots on no less than 4,856 farms in 1909. There are now no less than thirty-eight separate experiments which cover all the most important farm crops in the Province of Ontario and which deal

with varieties of crops, mixtures of grains and grasses, application of commercial fertilizers, and different methods of cultivating the soil.

The experimenters deserve great credit for the work they are doing, and we believe that that work is being appreciated by the farmers generally, as being a movement which is largely concerned in the upbuilding of progressive agriculture in Ontario. As many of the experimenters combine the practical experience obtained on the farm with the educational training secured at the Agricultural College as well as the special training furnished by successfully conducting co-operative work on their own farms for several years in succession, the reports are becoming very valuable indeed. It is recognized by all who understand the work which is being carried on that the Experimental Union has now a very valuable corps of ex-experimenters. Although the Experimental Union, through its system of co-operative experiments has been doing very excellent work in the past, we believe that greater results await it in the future and that it will continue to exert an increasing influence for the betterment of agriculture in Ontario.

Planting the nursery plot for work in plant improvement.

The Influence of Variety on Crop Production.

After carefully watching the crop production of the Province of Ontario and closely observing the experimental work at the Ontario Agricultural College for the last twenty-four years, where we have carefully tested each of 2,000 varieties of farm crops for at least five years, the writer is thoroughly convinced that the selection of proper varieties is a question of great importance from the standpoint of the practical farmer or the scientist who is carrying on systematic work in plant breeding. Some varieties are particularly desirable, owing to the fact that they usually produce very heavy yields per acre, while others are desirable, owing to the fact that they are exceptionally early in maturing. Some varieties of grain produce long straw, while other varieties produce straw which is very short in its growth. Certain varieties seem very susceptible to the attacks of smut or rust, while other varieties are almost immune. There are also great variations in the quality of the grain, in the strength of the straw and in many other respects.

We have a Province well suited for the cultivation of a great variety of farm crops. The conditions of soil and climate are particularly suitable for the cultivation of a number of the different classes of grain, root, fodder, hay and pasture

crops. While it is of great importance for the individual farmers to study the various classes of crops to meet their own particular conditions and circumstances, it is also exceedingly important that they study with great care the leading varieties of each class with the object of securing those particular varieties most suitable for them to cultivate. Although reports will be presented later to show many distinguishing results of a number of the leading varieties of farm crops, a concise statement is here presented to show the comparative yields of a few of the leading classes and of a few prominent varieties of each class which have been grown in the department of Field Husbandry at the College in periods of from thirteen to twenty years without change of seed from one farm to another.

Classes.	Varieties.	Average yield per acre.	
		Lbs.	Bushels.
Oats (20 years)	Siberian	2,982	87.7
	Joanette	2,972	87.4
	Egyptian	2,564	75.4
	Black Tartarian	2,431	71.5
Barley (20 years)	Mandscheuri	3,451	71.9
	Oderbrucker	3,125	65 1
	Mensury	2,899	60.4
	New Zealand Chevalier	2,731	56.9
Winter Wheat (14 years)	Dawson's Golden Chaff	3,288	54.8
	Imperial Amber	2,976	49.6
	Turkey Red	2,682	44.7
	Treadwell	2,676	44.6
Spring Wheat (Flour) (20 years)	Saxonka	1,878	31.3
	Red Fife	1,872	31.2
	Colorado	1,686	28.1
Spring Wheat (Durum or Macaroni) (17 years)	Wild Goose	2,892	38.2
	Medeah	2,046	34.1
	Ontario	1,410	23.5
		Tons	
Potatoes (20 years)	Empire State	6.7	221.7
	Rural New Yorker No. 2	6.0	200.9
	White Elephant	6.0	200.6
	Stray Beauty	4.8	160.1

It is important to note that, although the different varieties of oats, barley, wheat and potatoes have been grown in the Experimental department at the College for from fourteen to twenty years in succession, the average yield per acre for the last few years is even greater than the average yield per acre for the first few years of the whole period, in the case of practically all of the varieties under experiment. As there was no change of seed from one farm to another during the entire periods, it shows that it is quite possible to grow these crops for a considerable length of time without the introduction of fresh seed from other localities, providing proper care is exercised each year in the quality of the seed used. Far more depends upon the seed which is sown than some people seem to realize.

Although no varieties are presented in the accompanying table except prominent new kinds or old standard varieties, it will nevertheless be seen that there is a considerable difference in the average yields per acre of the varieties here reported. The Siberian oats surpasses the old Black Tartarian variety, which is

well known in Ontario, by 16.2 bushels per acre per annum. The Mandscheuri variety of barley surpasses one of the best two-rowed varieties by an average of 15 bushels per acre per annum. The Dawson's Golden Chaff winter wheat gave an average yield per acre annually of fully 10 bushels more than the Treadwell variety, which at one time was a favorite wheat in Ontario.

This table again brings out the fact that in a series of years, barley has again surpassed oats in yield of grain per acre when the results are presented in pounds instead of bushels. These results show the same order of yield per acre for the different classes of grain as those for similar classes over the Province of Ontario for twenty-seven years; viz., that the greatest number of pounds per acre were produced by the barley, second largest by winter wheat, and third largest by oats.

Improvement of Farm Crops.

The work in plant breeding has received a good deal of attention at the Ontario Agricultural College. Hon. W. M. Hays, Assistant Secretary of Agri-

Ten steers pasturing on eight acres of annual pasture of oats, 51 lbs.; Early Amber Sugar Cane, 30 lbs.; and common Red Clover seed, 7 lbs.; or a total of 88 lbs. per acre.

culture for the United States, who has done a good deal of work and has for many years taken a very deep interest in plant breeding in the United States, informed the writer this summer that the system and the extent of the work of plant breeding at our College he considered to be one of the two best in America at the present time. The only other institution which approximated the work here was the Agricultural College at Minnesota, and while their work in plant breeding at that Institution was probably as extensive as that at Guelph, it was not as thorough in some of the details. The work in plant breeding with farm crops at Guelph has included the thorough testing of over 2,000 varieties, for several years in succession, in order to make a careful study of the comparative characteristics and the productiveness of the various kinds. With these carefully conducted experiments with the different varieties as a foundation, the work in plant breeding has included a few of the best varieties through the establishment of new strains and the formation of new hybrids from the artificial cross-fertilization of some of the very best of the named varieties.

SELECTION. For several years past, work has been conducted in the improvement of some of the varieties of farm crops through pure selection. Some of these selections of individual plants have been made in the open field, but the most of them in the nursery plot in the experimental grounds, where thousands of seeds of each of a few varieties have been planted by hand, and the most promising plants of these have been selected as the mother plants of new strains. Seeds from the individual plants, whether taken from the open field or the nursery plot, have been planted by hand in rows and the resulting crops have been carefully noted. Seed from the most promising rows would be carefully saved and part of it would be sown the following year in rows and part of it in very small plots, usually 1-400 of an acre in size. Grain from the rows and the very small plots would be used for seed in the following year for rows, plots of 1-400 and 1-160 of an acre in size. The most promising strains would again be selected and the seed sown in the following year in a similar way and also on the larger plots in comparison with the varieties in the regular experiments. In accordance with this plan, there were 418 row plots, 10 1-400 acre plots, 69 1-160 acre plots, and 63 regular plots uniform with those used in the variety work. As some of these strains have now been grown in comparison with the standard varieties for two, three and four years, we here present the results of the leading selected strains in comparison with the original variety in each of a number of different varieties and classes of farm crops.

Class of Crop.	Variety.	Number of Years.	Yield of Grain per acre.	
			Standard Variety.	Selected Strain from Standard Variety.
			Bus.	Bus.
White Oats	Siberian	3	83.0	88.7
Black Oats	Joanette	4	75.9	88.5
Early Oats	Daubeney	3	89.4	93.5
Early Oats	Early Ripe	3	73 5	82.8
Six-rowed Barley	Mandscheuri	4	80 6	80.9
Two-rowed Barley	French Chevalier	4	48.4	50.5
Hulless Barley	Guy Mayle	4	41.0	42.9
Winter Wheat	Dawson's Golden Chaff	4	48.6	55.6
Winter Wheat	Bulgarian	4	37.2	37.7
Winter Wheat	Imperial Amber	4	37.7	37.6
Spring Wheat	Red Fife	3	34.8	35.6
Durum Wheat	Wild Goose	3	31.2	29.5
Durum Wheat	Medeah	3	28.1	28.7
Spring Rye	Saatroggen	4	29.4	33.4
Millet	Siberian	3	39.5	45.1
Field Beans	New Prize Winner	2	19.2	23.8

The results here tabulated show that in nearly all cases the selected strains have given comparatively higher yields per acre than the varieties. In some cases this increase is quite marked and especially is this true in the case of the Joanette oats, Early Ripe oats, Dawson's Golden Chaff winter wheat and Siberian millet. While there are these differences in yield per acre, it must be remembered that productiveness has not been the only characteristic which has been considered in the selection. Weight per measured bushel, strength of straw, freedom from rust, etc.,

have all received careful attention. The thinness of hull of the oats, and the quality of the grain of wheat have been important factors in the selection of the improved strains.

It is the intention of the Department to do even more in the future to improve varieties through systematic selection than has been done in the past. We believe that there is room for very excellent work along this line. Although we have already selected some strains which we believe are improvements on some of the best of the standard varieties, we believe that we can do greater work along this line in the future than has been accomplished in the past. The work of Dr. Nilsson, Svalof, in the selection of individual plants as the foundation of new strains has been very marked and the account of his work is exceedingly interesting. I would recommend anyone specially interested in this line of work to secure the book entitled "Plant Breeding," written by Hugo DeVries and printed in 1907 by the Open Court Publishing Co., Chicago.

Cross Fertilization. Even though we may secure, through experimental work, the best varieties of farm crops and start new strains through selection, it seems very difficult to obtain improved strains of the best varieties which will possess in themselves combinations of all the desirable characteristics. In order to assist in securing these desirable combinations, cross fertilizations are made between varieties with the object of obtaining an occasional hybrid which will combine the good qualities and will eliminate the undesirable features of the parents. In order to illustrate this point, permit me to quote our experience with barley. We have found in our experiments at Guelph that a mixture of oats and barley sown together in different proportions will give a heavier yield of grain per acre than either oats or barley grown alone. As all of the best six-rowed barleys which we have been able to secure are considerably earlier in maturing than most of the best yielding varieties of oats, it has been necessary either to secure a late maturing two-rowed barley to mix with the most popular oats of Ontario, or to secure a very early maturing variety of oats, such as the Daubeney, to mix with the popular varieties of six-rowed barley. It seems indeed difficult to secure a high-yielding six-rowed barley which is sufficiently late in maturing that it can be mixed, for instance, with the Banner or the Siberian oats and ripen at the same time as either of these varieties. It is also very difficult to secure a strain of six-rowed barley by selection which will meet these conditions. We have therefore been endeavoring, through cross fertilization of the Mandscheuri six-rowed barley and a late two-rowed variety, such as the Chevalier, to secure a hybrid six-rowed barley with stiff straw and the power of producing high yields of grain of good quality, and at the same time being a barley which will mature about the same time as the Chevalier variety of barley or as the Banner or Siberian varieties of oats. It might here be stated that the results are very encouraging, and we now have a hybrid barley which seems to fill these requirements better than any variety or any strain which we have been able to secure from any source through the introduction or the selection of plants. This new hybrid is yet only grown in small quantities and will probably not be ready for distribution for about two years. All of our work in hybridization with the various kinds of farm crops is carried on with definite objects in view, as illustrated by the one case just referred to. We believe that the reader will see the value and the importance of this line of work, but he must remember that it is a department of investigation which has been developed with farm crops to only a very limited extent in any part of the world.

It therefore takes a considerable amount of time and of patience to accomplish desirable results in this field of operation, the underlying principles of which have been so little known.

Work in hybridization was started at the Ontario Agricultural College in 1902 and has been continued each year since that time. Some of our principal farm crops, such as wheat, oats, barley and peas are naturally self fertilized. If we artificially cross fertilize the varieties of any of these classes of grain, we break up the characteristics of the individual varieties and get a great many different combinations. By careful study and selection, new varieties can be obtained which come true to type and which are different from either of the parents. As this work deals with the very principles of heredity, it requires a deep study on the part of those engaged in the work, and it also furnishes some most valuable information in giving us a greater and a better knowledge of the principles of heredity as it affects life in its various forms.

It was my privilege to visit Luther Burbank in California in 1906. Mr. Burbank has certainly done much to lead the way in the line of plant breeding. He has, however, worked almost entirely with plants which are increased by vegetative propagation, and consequently he does not require to plant the seeds of his hybrids. In obtaining his ideal plants he can easily reproduce the same by means of runners, cuttings, scions, buds, tubers or bulbs, as the case may be. In breeding many of our cereals, however, we cannot increase our plants in this way but are required to secure the seed and to continue the selection of the individual plants until they become perfectly fixed in all characteristics.

In 1909, we grew separately about 100,000 hybrid plants at our College, resulting from twenty-five distinct crosses made within the past seven years between leading varieties of winter wheat, spring wheat, oats, barley and peas. Besides the individual plants here referred to, we had in our experimental grounds 198 plots of hybrids of the following sizes: 31, each 1-100; 49, each 1-160; 106, each 1-400; and 12, each 1-1000 part of an acre. A great deal could be said regarding the methods used and the progress of the work, but we prefer at present to content ourselves with these simple statements. We hope before very long to show to the Province of Ontario that we have been able to originate, through cross fertilization, new varieties of farm crops which are of very great value indeed to the farmers of the Province. Some of our thinnest hulled and best yielding oats and some of our most promising barleys during the last couple of years are amongst the hybrids which we have originated, but these hybrids have not yet been grown for a sufficient length of time to enable us to be absolutely sure that they will come perfectly true to type in all characteristics.

The Yields of Plants as Influenced by the Size of the Seeds Used.

A very large amount of work in seed selection has been conducted at Guelph, and besides being reported from time to time in the annual reports of the College, the results were presented in a summary form in Part I. of the Annual Report of the Farmers' Institutes for the Province of Ontario for 1907, and in an abbreviated form in the College Report for 1908.

The average results of these experiments go to show that where equal numbers of large plump and small plump seeds of barley, spring wheat, winter wheat, oats, and field peas were used in comparison, but in every instance the larger seed produced the larger yield of grain. In no case did the smaller seed produce a greater yield of straw or a greater weight of grain per measured bushel than the

seed of a larger size, but in three instances the results were similar. These experiments with each class of grain were repeated from five to eight or nine years. It seems very evident indeed from the work conducted at Guelph that a large grain will produce a larger, a more vigorous, and a more productive plant than a small grain of the same variety and of equal soundness and vitality.

The Value of Sprouted Wheat for Seed Purposes.

As the result of quite extensive experiments conducted in each of two years in which the harvest seasons were very wet, it was found that the sprouting of winter wheat in the field before it was harvested injured the seed grain a great deal for seed purposes. When the grains were badly sprouted, not only did fully four-fifths of them decay in the ground, but even those which did grow produced plants which were very uneven in growth. Even a very slight sprouting in the field checked the vitality of the seed grain considerably and in a portion of the grain completely killed the sprouts.

Shrunken, Broken, and Immature Seed of Winter Wheat.

Twelve separate tests made at the College furnish interesting results in showing an average increase in yield of grain per acre of 6.8 bushels from large as compared with small seed, of 7.8 bushels from plump as compared with shrunken seed, and of 35.6 bushels from sound as compared with broken seed.

Seed which was allowed to become thoroughly ripened before it was cut, produced a greater yield of both grain and straw and a heavier weight of grain per measured bushel than that produced from wheat which was cut at any one of four earlier stages of maturity.

Shrunken and Broken Seed of Spring Grains.

The results of experiments which were conducted for a period of six years show that on the average there was an increase in yield of grain per acre of 7.8 bushels from plump as compared with shrunken barley, and of 5 bushels from plump as compared with shrunken spring wheat. In comparing sound grain with that which had been broken by the separator in threshing, the average yield obtained from the former surpassed that obtained from the latter by 10.6 bushels per acre in the experiments with barley for six years and of 19 bushels per acre in the average of the experiments with peas for nine years. In these experiments, equal numbers of whole seeds and double the number of broken or half seeds were used. In all cases, the seeds were counted with care and accuracy and were sown in plots twenty-five links square.

Treatment of Grain for Smut.

In each of five years, some of the most highly recommended treatments for the killing of the loose smut in oats and the stinking smut in wheat were used, and very careful determinations were made to ascertain the comparative influence of the different treatments. Those treatments which have been the most effectual in destroying the loose smut in the oats and the stinking smut in the wheat were as follows:

(1) Immersion in Diluted Formalin. The solution of formalin used for the immersion process was made by pouring one pint of the formalin into 42 gallons of water, and the seed oats were immersed in the solution for twenty minutes.

(2) Sprinkling with Diluted Formalin. One-half pint of formalin was poured into five gallons of water. The oats were then sprinkled with this solution and carefully stirred until the grain was thoroughly moistened.

(3) Immersion in Hot Water. For this treatment, the grain was placed in a bag, which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature of between 130 degrees and 135 degrees F. The grain was occasionally stirred, and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(4) Immersion in Bluestone Solution for Twelve Hours. In this treatment the bluestone solution was made by dissolving one pound of bluestone in 25 gallons of water, and the oats were immersed in this solution for a period of twelve hours.

The results of all the experiments show that the greatest yields of both winter wheat and oats per acre were produced from immersing seed in a solution made by adding one pint of formalin to 42 gallons of water, in which the grain was immersed for a period of twenty minutes. This treatment was easily applied, comparatively cheap, effectual in killing the smut spores, and also effectual in producing the largest average yield of both wheat and oats per acre of all the treatments used.

Susceptibility of Varieties of Oats to Attacks of Smut.

The results under the previous heading show that oats can be effectually treated for the prevention of smut. Some of these treatments have been known for some years past. The difference in the susceptibility of different varieties of oats to the attacks of smut, however, has apparently received but little consideration. The writer, a few years ago, considered that if the smut spores were present and the weather and soil conditions were favorable, there was almost sure to be a development of smut on all kinds of oats, and that it mattered but little as to the variety. Recent investigations which we have made at Guelph, however, seem to show that there is a very marked difference in the different varieties of oats regarding their susceptibility to the attacks of smut. During the years 1902, 1903, 1904 and 1905, we did not treat our varieties of oats for smut, but carefully picked out all smutted heads each year and kept an accurate record of the amounts of smut produced in the different varieties. In the spring of 1906, however, the varieties were all carefully treated by immersing the seed for twenty minutes in a solution made from one pint of formalin and 42 gallons of water. Since that time, the same varieties have not been treated. The following table gives the number of smutted heads taken from a plot 10 links wide by 100 links long from each of six different varieties of oats in each of the past eight years, four of the years being immediately before and four immediately after the treatment.

The table here presented shows two very interesting features, viz., the marked differences in the different varieties in their apparent susceptibility to smut, and the effectuality of the treatment in destroying the smut which increases only slightly from year to year. When the oats are grown on a farm, however, and the threshing machine comes from one farm where the smut is very bad, it is almost

sure to bring smut spores with it and thus to contaminate the oats on the next farm, even though the seed had been treated in the spring previous. In order to keep some of the varieties of oats comparatively free from smut, therefore, it is necessary to treat occasionally and to watch carefully that smut spores are not introduced in considerable quantities from one farm to another.

Variety.	Before Treatment.				After treatment.			
	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
Early Ripe	0	0	3	0	0	0	0	0
Joanette	20	9	10	18	0	2	12	1
Siberian	32	43	78	20	0	1	0	0
American Banner	116	303	317	22	0	3	2	4
Black Tartarian	332	608	369	62	0	3	12	15
Early Champion	634	380	1,244	166	0	11	9	5

It will also be seen that the amount of smut varies considerably in different seasons, for instance, there was considerably more smut in nearly all varieties in 1904 than there was in 1905.

It will also be noticed that at least one variety of oats, viz., the Early Ripe, appears to be practically immune from the attacks of smut. This is the earliest oat amongst some two hundred and fifty varieties which we have grown in the experimental grounds. The grain, however, is long and slender, giving a light weight per measured bushel. While it is true that there were three smut heads found in the Early Ripe variety in 1904, it is quite probable that this variety was entirely immune when we consider that fully 17,000 grains of oats were sown in each plot, and that it would be a very easy matter for one seed of another variety of oats, which is not immune to smut, to grow as an impurity in the plot and to furnish three smutted heads. A seed might easily be introduced by means of manure or in some other way. Taking advantage of the early maturity and the apparent immunity to the attacks of smut, we have used the Early Ripe variety to cross with the American Banner with the hope of securing a hybrid which will be early in maturing, immune to the attacks of smut, and at the same time will produce a large yield of grain of good quality. A large number of hybrids have been produced in 1909, and these plants have been carefully noted and have been stored for a more thorough examination during the winter season.

Different Quantities of Flax Seed per Acre.

In each of five years, four varieties of flax have been sown at the rate of one peck, two pecks, three pecks, eight pecks, twelve pecks, and sixteen pecks per acre, making in all twenty-four lots in the experiment each year. The following table gives the average results of the experiments for the past five years.

It will be seen that the longest straw was produced when less than one bushel of seed was used. It will be noticed, however, that the greatest yield of straw was produced when two bushels or more of seed were used per acre. These results might be interesting in the study of the length and the amount of fibre produced.

It should be remembered that the thin seeding encourages a considerable amount of branching of the stems, while the thick seeding produces straight stems with but little branching.

Amount of Seed Sown.	Straw or Fibre Producing Material.		Weight per measured bushel.	Yield of grain per acre.	Yield of grain per acre, less amount of seed sown.
	Height of crop.	Yield of straw.			
	inches.	tons.	pounds.	bushels.	bushels.
1 Peck per acre.	29	1.55	54.9	14.9	14.6
2 " "	29	1.68	54.7	15.2	14.7
3 " "	29	1.96	54.8	18.6	17.8
8 " "	28	2.24	54.6	19.9	17.9
12 " "	27	2.35	54.3	20.2	17.2
16 " "	26	2.24	54.2	18.0	14.0

In the average yield of seed per acre, it will be seen that where twelve pecks of seed were sown, slightly over twenty bushels of seed were obtained. When the amount of seed used, however, is subtracted from the amount of seed produced, the greatest yield has resulted from eight pecks per acre, which is only slightly more than that obtained from three pecks per acre. There was a marked difference in the yield of seed from the different varieties used in this experiment as will be seen under the discussion of the varieties of flax in another part of this report.

The Stooling of Cereals as a Factor in Determining the Amount of Seed per Acre.

Strange though it may seem, there appears to be but very little definite information regarding the stooling or the tillering of cereals as a factor in determining the amount of seed which is required per acre, in order to give the best results. While it is true that the stooling of the cereal plants is influenced by the fertility of the soil, the conditions of the weather, etc., it is also true that it is influenced by the variety of grain and by the thickness of the sowing. The fertility of the soil, the thickness of the sowing, and the varieties used are largely under the control of the farmer. Therefore, the stooling or the tillering of the grain crops forms an exceedingly important subject for study and investigation.

Although but little has been done in this investigation in America, we should mention that a certain amount of study was given to this subject at the Wyoming Experiment Station, and the results were published in a bulletin issued in 1898, The general conclusion from the experiments conducted in Wyoming is stated as follows:

"The study of our experiment seems to indicate that in farm practice, sowing seeds so plants will be secured about one inch apart in the drills, will produce the largest yields per acre of wheat or barley, but that oats should probably be planted a little thicker than this."

This conclusion, however, apparently ignores the fact that there is a marked difference in the stooling powers of different varieties of oats and barley and of wheat. Outside of the work conducted at Wyoming, I can find but little trace of any valuable experiments along this line in America. In order to ascertain whether such work has been carried out and the results published, other than I had been

able to find, I wrote to Mr. J. I. Schulte, who is the editor on "Field Crops," of the Experiment Station Record, in connection with the Department of Agriculture at Washington. From Mr. Schulte's reply to my inquiry, I make the following quotation:

"I do not recall any important work published recently on the tillering of grains. One or two Germans have reported observations on correlation in some of the small grains in which the stooling power was taken into consideration. This is a very important subject and one which, as you suggest, has not received the attention it merits."

Although some work has been done at our College previous to the past year in ascertaining the stooling powers of the varieties of cereals under experiment, more extensive work was started in 1909 than ever before. The work for the present year was confined almost entirely to oats and included the following investigations:

(1) Planting by hand sixty-eight seeds in rows a foot apart and with seeds a link apart in the row of each of eighty varieties of oats.

(2) Both large and small seeds planted in plots by hand, one, two, three, four, six, eight, and twelve inches apart both ways, with each of five different kinds of oats, thus making seventy plots in all.

(3) Seed oats planted by hand in rows eight inches apart, with the seeds one-half inch, one inch, one and one-half inches, two inches, three inches, four inches, six inches, and eight inches apart in the rows with each of five different varieties, making in all thirty-five plots.

(4) Sowing with the grain drill and broadcast by hand each of four kinds of oats at the rate of two bushels and four bushels per acre, making a total of sixteen plots.

The Stooling Powers of Different Varieties of Oats. As the result of the investigations in 1909, the varieties of oats showed very marked differences in stooling properties. In order to illustrate this point more clearly, we here enumerate a few varieties which show marked variations in this respect:

Varieties.	Average Number of Stools per Plant.	Varieties.	Average Number of Stools per Plant.
Burt	22	Sixty Day	17
Joanette	21	Siberian	14
Early Ripe	19	Abundance	11
Yellow Kherson	19	Storm King	8
Daubeney	18	Tartar King	8
American Banner	17	Early White Jewel	6

The Influences from Planting Oats at Different Distances Apart. Many important results were obtained from experiments indicated above, under numbers 2 and 3. As only one year's work, however, has as yet been accomplished, it was thought wise to withold the detailed reports until further results could be obtained. It might be stated, however, that as the distance between the oat plants increased, there was also an increase in the number of the stools per plant, in the percentage of rust, in the lateness of maturity, and to a limited extent in the height of the crop, and there was a decrease in the yellowness of the plants in the dry weather in the summer.

Influence from Seeding with Different Amounts of Oats per Acre. An experiment was conducted in 1909 in plots measured off in one of the large

fields of the farm proper, there being in all sixteen plots. Four varieties were used for the experiment. Each variety was sown at the rate of two bushels per acre and four bushels per acre, both with the grain drill and broadcast by hand. The oats used for this experiment were Joanette, the American Banner, the Regenerated Abundance (Imported Seed), the Regenerated Abundance (Ontario seed from crop produced from seed imported in 1907). The following table gives the result of the four kinds of grain sown at the rates of two bushels and four bushels per acre, each result being the average of the crop sown broadcast and with a grain drill.

Quantity of seed sown per acre.	Varieties.	Weight per measured bushel.	Yield of straw per acre.	Yield of grain per acre.
Bushels.		Lbs.	Tons.	Bus.
2	Joanette	30.3	1.70	68.9
	Regenerated Abundance (imported seed)	26.9	1.22	51.7
	Banner	25 4	1.39	61 1
	Regenerated Abundance (Ontario seed)	28.2	1.35	61.3
4	Joanette	32.6	1.65	78.6
	Regenerated Abundance (imported seed)	30.6	1.29	60.7
	Banner	27.6	1 56	69.1
	Regenerated Abundance (Ontario seed)	30.5	1.34	58.3

It will be seen that this year slightly better results were obtained from four bushels than from two bushels per acre. It should be stated that, owing to the unusually late, wet season the oats were not sown until the 15th of May. The greatest yields were produced from the Joanette and from the Banner, when sown at the rate of four bushels per acre, and the lowest yields were obtained from Imported seed of the Regenerated Abundance, sown at the rate of two bushels and from Ontario seed of the Regenerated Abundance, sown at the rate of four bushels per acre. In averaging the four plots of each different class of grain, we obtained the summary results as follows:

Varieties.	Weight per Measured Bushel.	Straw per Acre.	Grain per Acre.
	Lbs.	Tons.	Bushels.
Joanette	31.5	1.68	73,7
Regenerated Abundance (Imported seed)	28.8	1.26	56.2
Banner	26.5	1.48	65.1
Regenerated Abundance (Ontario seed)	29.3	1.35	59.8

In averaging the results from the eight plots sown with a grain drill, we obtained a yield of 66.4, and from those sown broadcast, 61 bushels per acre.

Growing Grains in Mixtures for Grain Production.

It is interesting to learn from the November report of the Ontario Bureau of Industries that there were 474,530 acres in Ontario devoted to the growing of grains mixed together in certain combinations in the year 1909. As in the previous year, Wellington County had the greatest area of mixed grains for grain produc-

tion. Naturally, those counties most deeply concerned in stock raising are the counties which devote a good deal of attention to the growing of mixed grains in proper combinations for producing large yields of grain suitable for stock feeding.

Within the past twenty years, a large amount of experimental work has been carried on at the College with the object of gleaning reliable information regarding the value of different seed mixtures in comparison with one another, and with the same grains when grown separately for the production of both grain and straw. Most of these experiments have been conducted for several years in succession, and the results which have already been obtained have exercised a considerable influence throughout Ontario in the general sowing of certain grains in definite proportions.

An experiment was conducted for five years in succession in growing oats, barley, spring wheat, and peas separately and in eleven different combinations, having two, three, or four grains in each mixture. The results show that the grain which was sown in mixtures produced larger yields per acre than the same kinds of grains sown separately in from ninety to ninety-five per cent. of the tests. Of the eleven different mixtures used, the combination of oats and barley gave the highest average yield of threshed grain per acre. This mixture also gave a decidedly larger yield than any of the grains grown separately.

Another experiment was conducted in duplicate in each of five years, in order to ascertain whether a seed mixture composed of one bushel of oats and one and one-half bushels of barley per acre could be improved by the addition of a small quantity of some other kind of seed. In addition to the mixture of oats and barley here mentioned, one-half bushel of flax, Emmer, spring wheat, and hulless barley were added, making in all five different combinations. The average results of the ten tests made in the five years show that the greatest yield of grain per acre was produced by the use of oats and barley without the addition of any other kind of grain, as included in this experiment.

Different Proportions of Barley and Oats Grown Together.

In each of six years, an experiment was conducted in duplicate at the College by sowing nine different proportions of oats and barley in order to determine which mixture and which quantity of seed would give the best results in the production of grain and straw. The lightest seeding used consisted of one-half bushel of oats and one-half bushel of barley, and the heaviest seeding of one and one-half bushels of oats and one and one-half bushels of barley per acre. The experiment was started in 1899 and finished in 1904. The average results show that the greatest number of pounds of grain per acre was produced from a mixture of one bushel of oats (34 pounds) and one bushel of barley (48 pounds) or a total amount of 82 pounds of mixed seed per acre.

Another experiment was started in the spring of 1907 and has been conducted for three years in succession. This also consisted in testing nine different proportions of oats and barley. A mixture of four pecks of oats and four pecks of barley, by weight per acre, was the only mixture which was similar in this and in the previous experiment. The experiment was conducted twice in 1907; once by using the Mandscheuri barley and the Daubeney oats, and once by using the Chevalier barley and the Siberian oats. In 1908 an experiment was conducted the same as 1907, with the exception that the two-rowed Canadian barley was used

instead of the Chevalier barley in combination with the Siberian oats. In 1909, the varieties used were similar to those described for 1908. The following table gives the average of the duplicate results of this experiment for the three years in tons of straw and in pounds of grain per acre, and also shows the average percentage of each kind of grain in the crops produced:

Mixtures. Quantities of Seed sown per acre by weight.	Percentage of Oats and of Barley in crop (3 years)		Average yield per acre. (3 years).	
	Oats.	Barley.	Straw.	Grain.
			tons.	lbs.
3 pecks oats, 3 pecks barley	38	62	1.40	2,303
3 " 4 "	32	68	1.42	2,277
3 " 5 "	27	73	1.39	2,342
4 " 3 "	45	55	1.43	2,302
4 " 4 "	40	60	1.43	2,399
4 " 5 "	34	66	1.38	2,376
5 " 3 "	48	52	1.43	2,340
5 " 4 "	49	51	1.32	2,323
5 " 5 "	39	61	1.33	2,255

It will be seen in this experiment, as in the one previously referred to, that the largest yield of grain per acre was produced by a combination of four pecks of oats and of four pecks of barley, or from a mixture of one bushel of each, by weight. A combination of four pecks of oats and of five pecks of barley per acre produced the second highest yield of grain, but it will be noticed that, although there was an increase of twelve pounds of seed per acre, there was a decrease of twenty-three pounds of grain per acre, or a difference of thirty-five pounds in favor of the mixture of one bushel per acre of each kind of grain. A study of the relative proportions of grain in the average crops produced is interesting and worthy of examination.

Another experiment was started in 1907 and has now been conducted for three years in succession, in comparing different varieties which can be grown in combination in order to find out the most desirable mixtures for use. A medium ripening variety of oats and a medium ripening variety of barley do not, as a rule, mix well together, owing to the fact that barley generally ripens several days earlier than oats. For this purpose a very early variety of oats should be used with a six-rowed barley, such as Mandscheuri, or a very late variety of barley should be used with an ordinary maturing variety of oats, such as the Banner. If this precaution is not taken the varieties will not ripen together and the results are decidedly less satisfactory, even though the yields might in some cases be slightly greater. The following table gives the average results in yield of both straw and grain per acre for the three years.

Mixtures of Barley and Oats—Yields for Three Years.

The results of the three years' experiments in testing nineteen different mixtures show that the mixture of Mandscheuri barley and a very early variety of oats, such as the Daubeney or the Alaska, give high results in yield of grain per acre. A mixture of Mandscheuri barley and Banner oats gave a yield of fully one

hundred pounds per acre less than the mixture of Mandscheuri barley and Daubeney oats in the average of the three years' experiments. The combination of Mandscheuri barley and flax has also given particularly good results.

Mixtures. Quantities of seed per acre, by weight.	Percentage of Barley and other grains in crop. (3 years)		Average Yield per acre. (3 years)	
	Barley.	Other Grains.	Straw.	Grain
			tons.	lbs.
Black Hulless Barley, 60 lbs., Common Emmer, 40 lbs.	62.16	37.84	1 28	2,089
Guy Mayle Hulless Barley, 60 lbs., Siberian Oats, 34 lbs....	47.81	52.19	1.54	2,443
Black Hulless Barley. 60 lbs., Siberian Oats, 34 lbs.....	58 25	41.75	1.40	2,239
Two-rowed Canadian Barley, 48 lbs., Banner Oats, 34 lbs...	54.24	45.76	1.56	2,433
Two-rowed Canadian Barley, 48 lbs., Siberian Oats, 34 lbs..	54.43	45.57	1 49	2,350
French Chevalier Barley, 48 lbs., Siberian Oats, 34 lbs	52.24	47.76	1.80	2,460
Mandscheuri Barley, 48 lbs., Daubeney Oats, 34 lbs.....	72.54	27.46	1.35	2,659
Mandscheuri Barley, 48 lbs, Alaska Oats, 34 lbs	69.54	30.46	1.44	2,639
Mandscheuri Barley, 48 lbs., Siberian Oats, 34 lbs.....	67.25	32.75	1.36	2,317
Mandscheuri Barley, 48 lbs., Banner Oats, 34 lbs.....	66.98	32.02	1.49	2,552
Mandscheuri Barley, 48 lbs., Joanette Oats, 34 lbs.....	70.84	29.16	1.54	2,475
Mandscheuri Barley, 48 lbs., Black Hulless Barley, 60 lbs.	61.38	38.62	1.28	2,442
Mandscheuri Barley, 48 lbs., Guy Mayle Hulless Barley, 60 lbs	69.46	30.54	1.35	2,535
Mandscheuri Barley, 48 lbs., Dakota Mammoth Rye, 56 lbs..	63.95	36.05	1 56	2,135
Mandscheuri Barley, 48 lbs., Common Emmer, 40 lbs	72.38	27.62	1.34	2,460
Mandscheuri Barley, 48 lbs., Wild Goose Spring Wheat, 60 lbs.	72.41	27.59	1.46	2,346
Mandscheuri Barley, 48 lbs., Early Britain Peas, 60 lbs....	86.52	13.48	1 36	2,534
Mandscheuri Barley, 48 lbs., Prussian Blue Peas, 60 lbs...	84.67	15.33	1.50	2,301
Mandscheuri Barley, 48 lbs., Flax, 56 lbs.....	88.94	11.06	1.42	2,667

Eight Kinds of Grain Grown in Combination.

In each of three years an experiment has been under way in which eight kinds of grain have been used in different combinations. One of the principal objects of this experiment has been to learn which of the eight kinds of grain will produce the greatest percentage of both straw and grain in the crop produced. The mixtures have been made up in two different ways: 1st, by using the same amount of seed of each variety as is usually sown when the grains are grown separately, and 2nd, by using equal quantities of seed of all the varieties. Each of the mixtures here described was sown at the rate of 112 pounds of seed per acre. Both parts of the experiment were conducted in duplicate each year. The following table gives the average results of the two tests in each of three years, and shows the percentage of each grain in the crop produced for each of the methods of combination indicated above.

These results are interesting from the fact that they show great variations in the power of the different varieties to reproduce themselves in competition with other varieties and classes of grain. The Mandscheuri variety of barley produced a greater percentage in the crop yielded, in the results of each experiment for 1909 and for the average of the three year period. Spring rye, Wild Goose wheat, field peas, and hulless barley do not possess the power of fighting their way in a mixture as well as either six-rowed barley or oats.

PERCENTAGE OF GRAINS IN MIXTURES.

Varieties used in each mixture.	Uniform weights of seed sown. 6 tests.		Quantities of seed in same proportion as when grown separately. 6 tests.		Average of two classes of mixtures 3 years. 12 tests.
	1909.	Average 3 years. 1907-09.	1909.	Average 3 years. 1907-09.	Average of two averages.
Six-rowed Barley (Mandscheuri)	22.5	25.8	21.1	24.1	25.0
Oats (Banner)	21.0	19.4	13.1	12.7	16.1
Spring Wheat (Red Fife)	10.5	11.8	14.0	13.1	12.4
Emmer (Common)	12.5	11.1	13.3	12.9	12.0
Spring Rye (Dakota Mammoth)	10.3	10.1	11.1	9.7	9.9
Spring Wheat (Wild Goose)	6.9	7.8	8.6	9.7	8.7
Field Peas (Early Britain)	9.9	6.7	11.6	9.8	8.3
Hulless Barley (Guy Mayle)	6.4	7.3	7.2	8.0	7.6

These results, when compared with those of another experiment which was started in 1902 and which was conducted for six years in succession by using twelve different kinds of grains, furnish some interesting data. The average results of the former experiment for the six-year period were as follows:

Varieties used in each Mixture.	Percentage of Grains in Mixtures.	
	Uniform weights of seed sown 6 yrs. 12 tests.	Quantities of seed in same proportion as when grown separately, 6 years, 12 tests.
Six-rowed Barley (Mandscheuri)	18.1	17.1
Spring Rye (Common)	13.3	14.1
Hulless Barley (Black)	12.5	14.2
Early White Oats (Alaska)	12.7	9.4
Black Oats (Joanette)	11 9	8.6
Emmer (Common)	7.0	7.9
Hulless Barley (White)	5.8	6.9
Peas (Field)	4 4	7.6
Spring Wheat (Wild Goose)	4.8	6.3
Grass Peas	5.6	4.7
Vetches (Common)	2.3	1.9
Flax (Common)	1.8	1.3

It will be seen from the examination of the results of the two experiments that the Mandscheuri barley has given the highest percentage of grain in the crops grown in the different mixtures in every instance. Emmer occupies a medium place in the average percentage of grain in comparison with the other classes, being about the same in the ripened crop as it occupied in the seed before

it was sown. All of these experiments go to confirm the results of other experiments and to show that it is difficult to make a mixture which will produce a heavier yield per acre than one made by a combination of barley and oats.

Different Varieties of the Same Class of Grain Grown in Combination.

Different varieties of winter wheat, of oats and of barley have been grown separately and in combination, with the object of ascertaining whether or not there was any advantage in growing mixtures as against growing the varieties separately. The results of experiments conducted with winter wheat for five years and of barley and of oats each for three years, show that the mixtures have given very similar results to the averages of varieties when grown separately. The results of our experimental work up to date, therefore, seem to strongly indicate that there may be a decided advantage from growing different classes of cereals together, but that there is no marked advantage from growing different varieties of the same class in combination.

Varieties of Barley.

According to the Crop Bulletin for November, 1909, the area devoted to barley in the present year was 695,262 acres. This area, in comparison with 438,784 in 1898 and 490,374 acres in 1899, shows a great increase in the number of acres devoted to the barley crop in Ontario during the last decade. Not only has the area been greatly increased, but we find that the yield of threshed grain per acre has increased 22.7 per cent. in the last twelve years, as compared with the average of the twelve years previous. The market value of the barley crop in Ontario in 1908 was more than double that for 1898. These increases have been due, in no small extent, to the introduction, distribution, and general cultivation of better varieties of barley than were grown previously.

Although the two-rowed barleys are grown extensively in a number of the European countries, the six-rowed varieties are used almost entirely in Ontario. They produce larger yields of grain per acre in nearly all instances. A large number of different varieties of six-rowed, two-rowed and hulless barleys, obtained from various countries, have been carefully tested in our experimental grounds. Practically all varieties have been grown for at least five years in succession, after which period the poorer varieties have been dropped and those making the most satisfactory returns have been retained for further experimental work. Whenever new and promising varieties are introduced from any source, whether through plant breeding work at the College or through importations from other countries, they are tested in the experimental grounds in competition with the other varieties. In this way the list is gradually changing as some of the varieties are dropped from the list and new varieties are added from time to time. There are indeed very few varieties of barley in America which we have not had in our comparative tests.

The accompanying table gives the average results of each of eighteen varieties of six-rowed barley, eight varieties of two-rowed barley, and seven varieties of hulless barley which have been grown in the experimental plots during the past five years:

Classes and Varieties.	Bearded or Beardless.	Color of Grain.	Average Height.	Per cent. of Rust.	Days to Reach Maturity.	Weight per Measured Bus.	Yield per Acre.	
							Straw.	Grain.
SIX-ROWED:			Ins.			Lbs.	Tons.	Bush.
Mandscheuri	Be.	White	38	3	105	50.9	2.03	72.6
Bonanza	Be.	White	38	3	104	50.6	1 64	70.9
California Brewing	Be.	White	32	8	106	46.6	1.79	68.9
Triumph	Be.	White	39	3	104	51 2	1.82	68.5
Oderbrucker	Be.	White	37	3	104	50.9	1 87	67.1
University No. 105	Be.	White	38	3	104	50.0	1.72	65.8
Common six-rowed	Be.	White	38	3	103	51.5	1.77	63.3
Scotch Improved	Be.	White	36	3	105	51.3	1.77	61.5
Mensury	Be.	White	35	4	104	52.1	1.82	61.2
Argentine Barley	Be.	White	30	11	108	45.6	1.50	57 0
Imperial six-rowed	Be.	White	35	3	103	52.3	1.64	55.8
Black French	Be.	Black	30	7	104	49.5	1.34	55.0
Success	Ba.	White	35	2	96	47.5	1.43	51.1
Ohio Beardless	Ba.	White	39	4	101	46.1	1.71	51.0
Champion Beardless	Ba.	White	35	2	96	47.6	1.42	49.7
Dakota Silver Beardless	Ba.	White	38	4	101	46.5	1.58	46 7
Humboldt	Ba.	White	34	2	96	47.1	1.40	46.2
Zero	Be.	White	37	6	119	52.2	2.15	44.7
TWO-ROWED:								
Imported No. 5,591 Iowa	Be.	White	32	4	111	53.1	1.91	60.7
Hanna No. 5,590 Iowa	Be.	White	32	4	109	53.8	1.79	59.8
Jarman's Selected Beardless	Be.	White	33	4	109	53.4	1.85	58.5
Hanna Gerste	Be.	White	32	4	110	53.2	1.82	56.7
Two-rowed Canadian	Be.	White	35	5	110	52.6	1.83	48.0
French Chevalier	Be.	White	32	6	115	51.5	1.88	47.0
New Zealand Chevalier	Be.	White	33	6	115	50.9	1.97	45.8
Duckbill	Be.	White	34	5	111	51.6	1.79	45.1
HULLESS:								
Purple	Be.	Purple	27	4	100	63.2	1.62	43.0
Guy Mayle	Be.	Green	25	4	99	60.7	1.55	41.1
Winnipeg No. 2	Be.	White	26	4	104	59.6	1 72	39.3
Black Hulless	Be.	Black	29	5	101	62.5	1.55	38.6
Hog	Be.	White	26	3	104	60.2	1 65	37.3
Hungarian	Be.	White	31	4	106	59.5	1.57	36.8
New White Hulless	Ba.	White	31	7	107	59.7	1.82	28.9

It will be seen that, although a number of the poorer varieties of barley have been discarded from our list from time to time, there is yet a great variation in the average yield per acre of the varieties which are at present under competition. It will be observed that there is a variation in the yield of about twenty-eight bushels per acre in the case of the six-rowed barleys, fifteen bushels per acre in the case of the two-rowed barleys, and of fourteen bushels per acre in the case of the hulless barleys; hence, it is important to study carefully the results of the different varieties in order to secure the best.

It will also be observed that all of the beardless, or as they are sometimes called, the bald varieties, occupy a comparatively low place in average yield of grain per acre. The highest yielding bald variety gives an average yield of grain of 21.5 bushels per acre per annum less than the average yield of the Mandscheuri variety. It will also be observed that in the average yield per acre for five years, some of the well-known varieties are greatly surpassed in productiveness by some of the newer kinds, as for instance, the Common six-rowed by the Mandscheuri by an average of 9.3 bushels per acre, the Duckbill by the two-rowed

Imported No. 5591 by 15.6 bushels per acre, and the Black hulless by the Purple hulless by 4.4 bushels per acre per annum.

Mandscheuri Barley. In the spring of 1889 one pound of the Mandscheuri barley, which was obtained from Russia, was sown on a small plot in the Experimental department to be tested with sixty other varieties. It produced comparatively stiff straw and gave a large yield of barley, which was of good feeding quality, being fairly thin in the hull and plump in the grain. It has continued to give good results, the average for the twenty-one years being 70.5 bushels of grain per acre in the experimental plots. Small quantities of the Mandscheuri barley have been distributed in each of the past sixteen years to those farmers who applied for the experiment with barley in connection with the Experimental Union. From these one-pound lots so distributed, there are now about 570,000 acres of the Mandscheuri barley grown in Ontario annually. The introduction of this barley has had a wonderful influence on the barley production of this Province.

O. A. C. Number 21 Barley. This is a new variety of barley originated at the College through selection. As it has not been grown with the regular varieties for five years in succession, it is not entered in the accompanying table, but it is exceedingly important that this variety should be mentioned in the comments on the results of barley, as it is evidently surpassing the Mandscheuri and is an exceedingly popular variety amongst the farmers who have grown it, not only in small plots, but also in their larger fields.

In the spring of 1903, 9,972 selected grains of the Mandscheuri barley were planted by hand at equal distances apart in the Experimental department at the College. When the plants were ripe, they were carefully examined and thirty-three of the most promising ones were selected, harvested, and threshed separately. In 1904, thirty-three separate lots of barley were grown from the plants selected in the year previous. From that time forward only the best strains were grown in the tests as follows: Fourteen in 1905, eight in 1906, seven in 1907, three in 1908 and three in 1909. In one instance, over forty bushels of barley were grown in 1905, as the product of one seed planted in the spring of 1903. Of all the selected strains, the one which is known as the O. A. C. Number 21 has made the best record. In each of the last three years, it has actually given better results than the Mandscheuri variety in yield of grain, in freedom from rust, and in both length and strength of straw, in the co-operative tests throughout Ontario. The grain is quite easily distinguished from that of the Mandscheuri barley.

In connection with the Ontario Agricultural and Experimental Union, one pound lots of the O. A. C. Number 21 barley were sent out with two other varieties to applicants in each of the past four years. Several thousand bushels of this barley were grown in Ontario from these small lots in 1908, and the growth in 1909 must have been very large as the reports were exceedingly favorable from the crop of 1908 and a great deal of grain was sold for seed purposes. One farmer in Huron County harvested 900 bushels of the O. A. C. Number 21 barley in 1908, which was the third crop produced from one pound of seed sown in the spring of 1906.

At the Winter Fair in Guelph in December of this year, seventeen lots of barley were entered in competition. Of this number, twelve were the Mandscheuri and five the O. A. C. Number 21. Of the seven prizes which were awarded, four went to Number 21 barley. This information is interesting in showing what a

stronghold the Mandscheuri barley has had in Ontario and also as to how the O. A. C. Number 21 barley is supplanting it. We believe that the O. A. C. Number 21 barley is the best variety which is now being grown on the farms of Ontario. A new hybrid barley which we have originated at Guelph is exceedingly promising, and in certain particulars may surpass the Number 21. This new hybrid barley, however, will not likely be distributed earlier than the spring of 1911 or 1912.

Winter Barley. Two varieties of winter barley were grown at the College in 1909. One variety, known as the Wood's winter barley, which has been grown at the College for a number of years, gave a yield of 51.8 bushels per acre, and a newer variety, known as the Tennessee winter barley, gave a yield of 33.3 bushels per acre in the past year. In the average results of thirteen years at the College, winter barley has given a yield of 53.8 bushels of grain per acre. Within the past fifteen years, the winter barley has been completely killed out on three occasions. If these years were included with the thirteen referred to, it would lower the annual average yield somewhat. Winter barley has proven to be rather more tender in Ontario than winter wheat, but when it survives the winter it usually gives high yields of grain per acre.

Varieties of Oats.

Of all the cereals grown in Ontario, no one class is cultivated so extensively as the oat crop. The area devoted to oats in this Province amounted to 2,695,585 acres in 1909, according to the November bulletin issued by the Bureau of Industries for Ontario. The market value of the oat crop produced in Ontario amounts to from thirty-five to thirty-eight million dollars annually.

Although about three hundred varieties of oats have been carefully tested at the Agricultural College, many of these have been dropped after five years' experiment, owing to the fact that other varieties proved more successful. Each year a few new varieties are added and a few of the more inferior kinds are dropped. In 1909, ninety-one different varieties and strains were under experiment at the College. Of this number, forty-eight named varieties have been under test for at least five years in succession. As the oat crop is such an exceedingly important one in Ontario, and as there is a marked difference in different varieties, it is considered advisable to give here in tabulated form the summary results regarding each of the forty-eight varieties grown during the past five years.

The average results of five years' experiments with each of forty-eight varieties show a marked difference in the characteristics and the productiveness of the different varieties. The table here presented furnishes some very interesting data worthy of careful study. It will be noticed that, as a rule, those varieties of oats which have given a large yield of grain per acre, have also been comparatively thin in the hull and have been only about average in weight of grain per measured bushel. Those varieties of oats which have given the lowest average yield of grain per acre have, as a rule, been comparatively thick in the hull and have given rather heavy weights per measured bushel, especially in some instances. In order to illustrate this point, your attention is drawn to the Daubeney variety which, in the average of the five years' experiments, gave a yield of 87.4 bushels per acre, a weight per measured bushel of 34 pounds, and a percentage of hull of 24.6; while the Early Dawson gave a yield of only 67.1 bushels per acre, but furnished grain which weighed 37 pounds per measured bushel, and that grain has an average percentage of hull of 35.7. The results in this table show that in many

cases the varieties of oats which weigh very heavy per measured bushel give a comparatively light yield of grain per acre and furnish oats which have a large percentage of hull. We have a good deal of evidence to show that very frequently those varieties of oats which weigh heavy per measured bushel are light yielders and of comparatively poor quality.

Varieties of Oats.	Per cent. Hull 3 years.	Average results for 5 years.						Yield per acre of grain	
		Heads M. or S.	Days to mature.	Height.	Per cent. rust.	Weight per measured bushel.	Straw per acre.	1909.	Average 5 years.
				Ins.		Lbs.	Tons.	Bush.	Bush.
Daubeney	24.6	S	102	42	9	34.0	1.91	98.4	87.4
Siberian	29.2	"	107	46	12	31.5	2.11	94.6	86.9
Alaska	22.5	"	101	44	8	34.8	1.89	100.7	85 3
English Glory	27.7	"	108	48	12	34.1	2.22	81.5	84 6
Peerless	27.0	"	109	48	12	33.7	2.22	81.3	82.5
Yellow Russian	29.4	"	109	45	10	32.6	2.09	64.9	81.9
New Zealand	29.2	"	110	46	10	32.3	2.12	68.4	81.4
Ligowa (imported German seed)	28.1	"	108	46	11	34.4	2.05	80.2	80.9
Early Champion	27.6	"	104	46	10	33.5	1.96	97.8	80.8
Vick's American Banner	28.8	"	110	47	12	33.9	2.34	70.4	80.8
Newmarket	28.2	"	108	46	12	34.2	1.99	84.2	80.1
Imported 534, Iowa	27.3	"	107	46	11	33.3	2.07	74.6	80.0
Waterloo	26.3	"	109	46	10	33.7	2.09	80.5	79.8
Imported No. 545, Iowa	27.8	"	107	44	11	33.6	1.97	71.9	79.7
University No. 6	27.6	"	108	46	10	34.3	1.87	74 3	79.6
Oderbrucker	29.9	"	110	45	12	34.0	2.11	73.2	78.9
Rennie's White Irish	28.2	"	108	45	11	33.7	2.04	78.9	78.7
Liberty	29.3	"	110	46	11	32.1	2.19	68.9	78.5
Irish Victor	28.8	"	110	46	12	33.6	1.96	70.7	78.2
Abundance	28.6	"	107	46	11	33.6	2.03	74.3	78.1
Probsteier	27.4	"	109	46	11	34.7	2.05	82.0	77.9
Joanette	25.1	"	107	38	7	33.6	2.28	81.1	77.7
Prince Royal	27.3	"	108	46	15	33.6	1.94	73.4	77.0
Prosperity	25.6	"	101	43	8	34.0	1.97	98.2	76.9
White Marvel	27.5	"	109	47	11	34.6	1.88	80.4	76.2
Early Ripe	26.2	"	98	40	8	28.3	1.93	85.1	76.0
Twentieth Century	28.0	"	107	45	13	33.2	1.99	82.4	75.3
Swedish Wisconsin No. 4	28.5	"	108	46	13	32.7	2.02	72.7	75.2
Bavarian	29.1	"	109	47	9	33.6	2.27	69.2	74.9
New Sensation	28.7	"	108	44	11	34.0	1.96	76.1	74.8
Sheffield Standard	27.6	"	108	45	13	34.5	1.85	83.0	74.4
Golden Beauty	27.9	"	109	46	11	34.3	1.95	64.8	73.2
Black Tartarian	30.2	M	112	45	11	30.6	2.15	66.6	72.9
Tobolsh	27.5	S	108	45	12	34.8	1.96	72 4	72.8
Waverley	28.2	"	111	46	12	34.2	2.02	57.8	71 9
Egyptian	30.6	M	109	45	12	35 9	2.28	71.5	71.1
Storm King	34.1	"	108	45	11	33.0	2 12	77.2	71.1
Scarboro	27.0	"	116	46	9	31.6	2.63	66.8	71.0
Sunshine	27.8	"	115	44	12	28.2	2.29	66.9	69.0
Besler's Hafer	28.1	S	112	50	12	32.8	2.34	70.2	68.9
Black Mesdag	34.0	"	99	45	18	29.8	2.18	75.4	68.1
Tartar King	32.4	M	107	47	13	33.6	2.02	73.6	68.0
Goldfinder	27.2	S	113	43	16	30.4	2.13	71.1	67.8
Pioneer	37.6	"	106	40	15	33.5	2.13	70.1	66.1
Zhelannie	34.4	"	104	48	15	34.7	2.45	83.7	64.8
Early Dawson	35.7	"	104	48	14	37.0	2.39	78.3	61.7
White Superior Scotch	34.4	"	104	48	15	36.7	2.22	61.9	56.4
Hulless Oats	.....	"	106	48	9	.....	2.83	49.8	43.6

NOTE.—M—Indicates mane or side oats; S—Indicates varieties having a spreading head.

The Daubeney and the Siberian variety of oats which head the list in average yield per acre for five years, are varieties which have been very prominent both in the experiments at the College and in the co-operative tests over Ontario, during the last few years. The Daubeney variety is a very early oat and possesses straw of medium height, a spreading head, and white grain of excellent quality, as indicated by the thinness of the hull. The Siberian variety possesses very good straw and is a large yielder of grain, but the weight per measured bushel in 1909 and 1906 was comparatively light, which lowers the average for the five years. The American Banner now stands tenth in the list in yield of grain per acre. Its yield in 1909 was much lower than usual. It is probably safe to say that the two varieties of oats most extensively grown in Ontario at the present time are the Vick's American Banner and the Siberian. The Daubeney appears to be grown more than any other variety for the purpose of mixing with six-rowed barley, such as the Mandscheuri, when oats and barley are grown in combination for grain production. The Sensation variety of oats, although furnishing an attractive grain which usually does very well at exhibitions, has not given as large yields per acre in the experiments at Guelph or in the co-operative experiments over Ontario, as some of the other varieties.

Besides the forty-eight varieties here mentioned, we grew forty-three varieties, strains and hybrids in 1909, but as these oats have not, as yet, been grown for five years in succession, the results are not presented in the accompanying table. Some most interesting results have been obtained, especially from some of the strains and from some of the hybrids. We have one hybrid between the Joanette and the Siberian which is an exceptionally heavy yielder. We also have another hybrid obtained from crossing the same two varieties which possess a white grain and which is thinner in the hull than any variety of oats which we have grown at the College. Fuller information regarding the new varieties, the improved strains, and the promising hybrids will be furnished after further experiments at the College.

Percentage of Hull in Oats.

In order to show the marked difference in the percentage of different varieties of oats and to show that these percentages remain in about the same order throughout a variety of seasons, a table is here appended giving the percentage of hull of each of four varieties in each of eight years.

Varieties.	Percentage of Hull.								
	1902	1903	1904	1905	1906	1907	1808	1909	Average 8 years.
Joanette.....	22.5	23.1	22.5	24.0	25.2	23.4	23 9	25.4	23.8
Daubeney.....	26.1	25.1	23.0	26.3	26.3	24.7	23.8	25.4	25.1
Early Dawson.	32.6	33.7	32.4	36.0	38.1	33 7	36.6	36.8	35.0
Pioneer	48.1	36 8	36.9	36.8	42.8	38.8	37.4	36.7	39.3

It will be seen from the table here presented that the Joanette, which is a black variety of oats, has given an average in eight years of only 23.8 per cent. of hull, while the Pioneer, which is also a black variety of oats, has given an average during the same period of 39.3 per cent. of hull. Many people do not give proper consideration to the quality of the oats when growing the varieties on their farms

or when buying the grain for feeding purposes. Here we have two varieties of oats grown for eight years in succession under similar conditions, and yet one variety will furnish on the average 15 1-2 pounds of meal for one hundred pounds of grain more than the other variety. The hull has but little value over the same weight of straw, hence a thin hulled oat is of very much higher feeding value than one possessing a thick hull.

The Strength of Straw of Oats.

We have, of late, received many inquiries regarding varieties of oats which are not apt to lodge before they ripen. We take careful notes of the percentage of each crop which lodges each year in the general experiments with the oats. During the last three years, however, a special experiment has been conducted by growing a few varieties of oats in duplicate on low land, in order to study very carefully the strength of the straw under rather severe conditions. The following table gives the percentage of crop lodged three weeks before ripening and also at the time of ripening of each variety of oats in 1909, and also in the average of three years' experiments:

Varieties.	Percentage lodged three weeks before ripening.		Percentage lodged when ripe.	
	1909	Average 3 years.	1909	Average 3 years.
Siberian	76	32	81	80
Golden Beauty	83	33	87	80
Liberty	29	10	40	32
Sheffield Standard	45	22	85	91
Banner	29	11	55	54
Tartar King	34	12	72	87
Daubeney	55	40	62	58
Early Champion	25	22	30	52

From the results here presented, it will be seen that those varieties possessing the stiffest straw when ripe, in the average of the six tests of the past three years, are the Liberty, the Early Champion, the Banner, and the Daubeney; and those possessing the weakest straw are the Sheffield Standard and the Tartar King. The percentage lodged three weeks before ripening show results slightly different from those obtained at the time of maturity. Particularly is this noticeable in regard to the Tartar King, which possesses straw which is comparatively stiff during the growing period, but which frequently becomes very brittle and of exceptionally poor quality when the oats are maturing.

In 1909, the Regenerated Abundance variety of oats was introduced into this experiment, and the strength of the straw was determined. It occupied an intermediate position, being slightly stiffer in the straw than the Tartar King but weaker than the Liberty, the Banner, or the Early Champion.

The Classification of Wheat.

According to some authorities, there are seven, and according to other authorities, there are eight distinct types or species of wheat. We have in the past been adhering to the classification which is made up of the seven types. A study of

the different classes of wheat is very interesting and instructive, as the different classes possess different characteristics. The species may be enumerated as follows:

(1) Common, fine, or soft wheat (*Triticum vulgare*).
(2) Turgid, or toulard wheat (*T. turgidum*).
(3) Hard, or flinty wheat (*T. durum*).
(4) Polish wheat (*T. polonicum*).
(5) Spelt (*T. spelta*).
(6) Emmer, or starch wheat (*T. dicoccum*).
(7) One-grained wheat (*T. monococcum*).

All of these types are grown annually at the Agricultural College at Guelph, and the most of them, more or less, over the Province. The greater number of wheats of both the winter and the spring varieties which are grown in Ontario belong to the first class and are used very largely for the production of flour.

Varieties of Winter Wheat.

Fully two hundred and sixty varieties of winter wheat have been grown at the Agricultural College within the past twenty years. All varieties are carefully tested for a period of five years, after which the inferior kinds are dropped and the most promising sorts are continued in future tests. In 1909, sixty-one varieties, besides a number of selections and hybrids, were under experiment. Of this number, ten varieties have been grown for less than six years, and fifty-one varieties for six years or over. As each of fifteen varieties has been grown for at least fourteen years, the average results of these are of special value. The following table gives, for each of these fifteen varieties, the average weight per measured bushel for thirteen years, the yield of grain per acre for 1909, and the average yield of both straw and grain per acre for the fourteen year period:

Variety.	Color of Grain.	Weight per measured bushel. 13 years.	Yield per acre.		
			Grain. 1909.	Average 14 years.	
				Straw.	Grain.
		lbs.	bus.	tons.	bus.
Dawson's Golden Chaff	White	60.2	47.0	3.2	54.8
Early Genesee Giant	White	60.4	50.0	3.3	50.4
Imperial Amber	Red	61.1	28.6	3.4	49.6
Russian Amber	Red	61.3	37.9	3.4	48.9
Egyptian Amber	Red	61.7	36.4	3.4	48.4
Early Red Clawson	Red	59.4	32.2	3 0	48.1
Rudy	Red	61.3	37.7	2.8	46.4
Geneva	Red	62.5	33.7	3.1	45.1
Tasmania Red	Red	61.9	24.9	3.1	44.7
Turkey Red	Red	61.6	34.4	2.9	44.7
Kentucky Giant	Red	61.5	40.4	3.0	44.7
Treadwell	White	60.9	42.3	3.0	44.6
Tuscan Island	Red	61.2	28.1	3.1	44 4
Bulgarian	White	61.0	37.4	2.9	44 4
McPherson	Red	62.1	33.2	2.8	43.0

The average results of the fifteen varieties are as follows: Weight per measured bushel, 63.1 lbs. for 1909 and 61.2 lbs. for the fourteen year period; and yield of grain per acre, 36.3 bus. for 1909 and 46.8 bus. for the fourteen year period. It will therefore be seen that in the experiments at the College in 1909, the winter

wheat gave a yield per acre somewhat below the average, but grain of superior quality, the weight per measured bushel being surpassed only once in fourteen years.

The Dawson's Golden Chaff stands the highest in the average yield of grain per acre of the fifteen varieties tested in each of fourteen years. It produces a very stiff straw of medium length, beardless heads with red chaff, and white grain somewhat soft but about the standard in weight per measured bushel. The Early Genesee Giant furnishes a straw of medium length and of fair strength, a short, compact, bearded head, and a grain of fairly good quality. The Imperial Amber produces a large amount of straw which is somewhat weak, a bearded head with red chaff, and a red grain of average quality. The straw of the Geneva, Tasmania Red, Turkey Red, Kentucky Giant and Tuscan Island is comparatively weak, but the grain is hard and weighs well per measured bushel.

Fifty-one varieties of winter wheat, grown in 1909, have been under experiment for at least six years. In the six years' test, the highest average yields of grain per acre have been produced by the Dawson's Golden Chaff (48.3 bus.) and eight other varieties, which resemble it very closely and which have yielded as follows: American Banner, 50.8 bus.; American Wonder, 50.3 bus.; Abundance, 49.7 bus.; Beardless Rural New Yorker No. 6, 49.6 bus.; Prize Taker, 46.9 bus.; Superlative, 46.3 bus.; Forty-fold, 46.1 bus.; and Extra Early Windsor, 44.8 bus. The highest average yields produced by varieties of other types in the six years' experiment are as follows: Genesee Reliable, 44.4 bus.; Prosperity, 44.4 bus.; and Crimean Red, 43 bus.

The heaviest weights of grain per measured bushel in the six years' test have been produced by the Northwester, 62.7 lbs.; Genesee Reliable, 62.3 lbs.; Geneva, 62.2 lbs.; Auburn, 62.1 lbs.; and Kentucky Giant, 62.1 lbs.

Of the sixty-one varieties of winter wheat, grown in 1909, the greatest yields of grain per acre were produced by the Prosperity, 54 bus.; No. 8 Red, 52.2 bus.; American Banner, 50.3 bus.; Early Genesee Giant, 50 bus.; Extra Early Windsor, 47.9 bus.; New Mammoth Amber, 47.5 bus.; Dawson's Golden Chaff, 47 bus.; and Economy, 46.9 bus., and the heaviest weights per measured bushel by the Northwester, 64.8 lbs.; Amherst Isle, 64.1 lbs.; Alberta Red, 64 lbs.; Michigan Amber, 63.9 lbs.; Genesee Reliable, 63.9 lbs.; McPherson, 63.9 lbs.; and Egyptian Amber, 63.8 lbs.

In 1906, in 1907, and again in 1908, the varieties of winter wheat grown in the Experimental department were tested for bread production in the Bakery branch of the Chemical department of the College. The varieties of wheat which produced the largest loaves of bread from equal quantities of flour in the average of three years' experiments are as follows: Crimean Red, Yaroslaf, Banatka, Turkey Red, McGarvin, Winter Red Fife, Northwester, Rudy, Tasmania Red and McPherson. These all possess red grain, and with two exceptions, bearded heads.

From the results of experiments conducted with different varieties of wheat at the College, it seems to be generally true that white wheats yield more grain per acre, possess stronger straw, weigh a little less per measured bushel, are slightly softer in the grain, produce a more popular pastry flour and furnish a somewhat weaker flour for bread production than the red varieties.

A considerable amount of work has been done during the past few years with the object of improving some of the best varieties of winter wheat by means of systematic selection and by cross-fertilization. It is interesting to note that during the last two years the highest results of all the winter wheat experiments both in yield of grain per acre and in weight of grain per measured bushel have been obtained from some of the selections and from some of the hybrids. In 1909, no

less than 21,365 hybrid plants of winter wheat were grown separately in the experimental grounds. Besides these, fifty-nine distinct plots of hybrids were under test. The results are very promising.

Varieties of Spring Wheat for Flour Production.

Spring wheat is not grown as extensively in Ontario as it was a few years ago, but in the northern and eastern parts this crop still receives a considerable amount of attention. Not only have we had under experiment the different varieties obtainable in Ontario, but we have imported other kinds from various countries of the world, and have tested them under similar conditions with those which we have grown in this Province. In order to present the results in as concise a form as possible, we have placed in the accompanying table the characteristics and the yields of each of twenty-two different varieties which have been grown for the past five years in succession.

Varieties.	Bearded or Bald.	Color of Grain.	Average Height.	Per cent. of Rust.	Days to reach maturity.	Weight per measured bushel.	Yield per acre.	
							Straw.	Grain.
			Ins.			Lbs.	Tons.	Bus.
Minnesota No. 163....	Ba.	Red	43	5	121	59.9	1.92	35.3
Climax.....	Be,	Red	46	4	119	60.9	1.93	34.9
Red Fife.....	Ba.	Red	44	6	121	60.0	1.89	34.8
Wellman Fife.....	Ba.	Red	44	7	121	59.8	1.98	34.2
Carleton.....	Be.	Red	46	7	121	60.9	2.01	34.0
Saxonka.....	Be.	Red	46	4	120	61.0	1.83	33.6
Hungarian.....	Be.	Red	40	4	116	63.0	1.82	33.6
Blue Democrat.....	Be.	Red	46	7	120	60.8	1.83	33.5
Pringle's Champion ..	Be.	Red	45	5	120	60.3	1.87	32.8
White Russian.....	Ba.	Red	42	5	122	59.2	1.84	32.2
Red Fern.....	Be.	Red	45	6	120	61.0	1.74	32.1
Preston.....	Be.	Red	43	8	117	60.1	1 66	31.1
Kolben	Ba.	Red	43	4	122	60 5	1.78	31 1
Herison Bearded.....	Be	Red	43	5	120	63.2	1.69	30.6
Perron Red.....	Ba.	Red	43	5	121	59.3	1.80	30.0
Minnesota No. 169....	Ba.	Red	44	4	122	59.7	1.70	29.8
Early Wonder.....	Ba.	Red	45	3	124	59 1	1.80	29.2
French Wheat	Be. &Ba.	Red	43	10	120	61.3	1.80	29.0
Colorado.....	Be.	Red	44	7	115	60.3	1.78	28.3
Russian (Argentine)..	Be.	Red	40	19	120	60.9	1.81	27.9
Chubut.....	Ba.	Red	40	17	115	61.9	1.65	27.5
Perron White.....	Ba.	White	43	9	118	57.9	1.54	27.5

The variety of spring wheat which occupies the highest place in yield of grain per acre is known as the Minnesota No. 163, and is a special selection made at the Minnesota Experiment Station a few years ago, under the guidance of Prof. W. M. Hays, who is now Assistant Secretary of Agriculture for the United States. We are sorry that this wheat does not give a heavier weight per measured bushel, the average for the last five years being 59.9 pounds or a trifle below the standard. The Hungarian variety, although standing seventh in the list in yield of grain per acre, has produced an average of only 1.7 bushels per acre less than the Minnesota No. 163 and it has produced a grain which weighs very heavily indeed, the average of the five years being 63 pounds per measured bushel; hence the Hungarian wheat weighs about three pounds per measured bushel more than the Minnesota No. 163 over the five

year period. The Red Fife is also three pounds per measured bushel less than the Hungarian variety. The baking tests made with the Hungarian this last year showed it to be a good bread producer. The Hungarian variety was imported from the Argentine Republic a few years ago through the kindness of one of our students who arranged to have this variety sent to us in order that we might test it in Canada, as it had been giving such good results in the Argentine Republic. We distributed this variety of wheat throughout Ontario in 1908 for the first time, and the average results of the experiments conducted on fifteen farms showed that it gave a little larger yield of both straw and grain per acre and was somewhat more popular with the experimenters than the Red Fife variety. As the demand was so great in 1908 for this variety we were unable to grow a sufficient amount that year for distribution in the spring of the present year.

Varieties of Spring Wheat for the Production of Macaroni.

The hard or flinty wheats (*Triticum durum*) are used largely for the manufacture of macaroni, but are now used more extensively than they were in former years for the production of flour which is frequently blended with the flour of the winter wheats, in order to give greater strength to the latter. Of this class of wheats, six varieties have been grown for seventeen years in succession. The following table gives certain average results for five years and of others for seventeen years of each of the six varieties here referred to.

Varieties.	Average Results for 5 years.				Average Results for 17 years.		
	Bearded or Bald.	Average Height.	Per Cent. of Rust.	Days to Reach Maturity.	Weight per Measured Bushel.	Yield of Straw per Acre.	Yield of Grain per Acre.
		Ins.			Lbs.	Tons.	Bus.
Wild Goose	Be.	42	3	121	61.9	2.1	38.2
Medeah	Be.	43	4	116	60.4	2.0	34.1
Sorentina	Be.	44	4	117	59.8	2.1	33.7
Bart Tremenia	Be.	41	3	118	61.2	1.9	33.5
Algiers	Be.	41	5	118	58.1	2.0	31.9
Ontario	Be.	48	9	132	56.2	2.2	23.5

The variety of durum or macaroni wheat which is the best known in Ontario is the one which occupies the highest place in yield of grain per acre of all the macaroni wheats grown at the College for a period of seventeen years. The Wild Goose variety not only gives 38.2 bushels of grain per acre, but it also furnishes a grain which weighs almost 62 pounds per measured bushel. In comparison with this, we have others both in the yield of grain per acre and in the weight per measured bushel which are very much lower. The table shows that the Wild Goose spring wheat is not surpassed by any other variety in yield of grain per acre, weight per measured bushel, or in freedom from rust. The Roumania variety of wheat, which was furnished to us through the kindness of Dr. C. E. Saunders, of the Central Experimental Farm at Ottawa, in the spring of 1907, has given us very good results in the past three years, producing a yield of 36.9 bushels per acre in 1907, 36 bushels per acre in 1908, and 34.9 bushels per acre in 1909. The Iumillo variety of durum wheat, which has become quite noted in certain parts

of the United States for its resistance to disease, surviving while practically all others have succumbed to rust, etc., under severe climatic conditions, has been under test at the College for the last four years, the yields being 29 bushels per acre in 1906, 33 bushels in 1907, 27 bushels in 1908, and 24 bushels in 1909. It has therefore given somewhat lower results than the Wild Goose variety in the yields of each of the past four years.

Varieties of Spring Wheat for Feeding Purposes.

A number of sensational articles appeared in the newspapers of Ontario and the United States a few years ago regarding a grain which was called Spelt, but which, in reality, proved to be Emmer. Although Emmer and Spelt have been grown at our College, more or less, for the last twenty years, the last named grain is scarcely known in Ontario, but the Emmer has become quite favourably known in some sections of the Province. Each of these two types or species of grain contains a number of varieties. They are used for grinding into meal for feeding to farm stock, owing to the fact that the chaff adheres to the grain and is not removed, except to a limited extent, in the process of threshing. The following table gives the average results of three varieties of Emmer and of four varieties of Spelt for a period of eight years:

Classes of crops.	Varieties.	Average result for 8 years.			Weight per measured bushel average of 7 years.	Aver. results for 8 yrs.	
		Per cent of rust.	Per cent of crop lodged.	Per cent of hull.		Straw per acre.	Grain per acre.
					Lbs.	Tons.	Lbs.
Emmer	Common	3	29	21	39.6	2 2	3,082
	Iowa	2	20	21	40.3	2.0	2,914
	Russian	2	23	21	40.3	1.9	2,895
Spelt	Alstroum	17	4	30	28 6	1.8	2,259
	Red	13	3	30	28.0	1.8	2,224
	White	13	3	31	28.1	1.6	2,002
	Dasyanthum	14	10	29	28.6	1.7	1,884

The results here presented in tabulated form are very interesting and show the striking differences in these two classes of grain for Ontario. The great superiority of Emmer over the Spelt as a grain producer is very clearly seen by the accompanying results. Not only does this prove true in our experiments at the College, but it has also been quite manifest in the co-operative experiments throughout Ontario during the past few years. In practically all tests which have been made, the Emmer yields decidedly heavier than the Spelt. It will also be noticed that the Emmer is much thinner in the hull, is much freer from rust, but possesses a somewhat weaker straw than the Spelt. From feeding experiments conducted in some of the Agricultural experiment stations in the United States, Emmer has produced results not very different from those obtained from barley.

Other Classes of Spring Wheat.

Within the past few years, sensational articles have been written in many of the papers of the United States and in some of those in Canada regarding wonderful results obtained from different kinds of spring wheat. Particularly is this

true of what was locally called Corn wheat in some of the Western states, but which is better known the world over as the Polish wheat (*Triticum polonicum*), and also regarding the Alaska wheat which belongs to the class Turgid or Toulard, and is known scientifically as *Triticum turgidum*. The Alaska wheat appears to be very similar indeed in appearance to the Seven Headed spring wheat or the Miracle variety of winter wheat, both of which have been grown at the College. In order to represent the results of these varieties, as grown at the College under similar conditions and to give the reader definite and somewhat extensive information regarding the results of these different wheats, the following table furnishes the yields per acre of both the Polish and the Seven Headed varieties in comparison with the Red Fife and the Wild Goose varieties in each of thirteen years:

Year.	Red Fife. (Triticum vulgare.)	Wild Goose. (Triticum durum.)	Polish. (Triticum polonicum.)	Seven Headed. (Triticum turgidum.)
	Bus.	Bus.	Bus.	Bus.
1897	20.7	23.1	16.3	6.5
1898	34.2	48 3	27.1	24.7
1899	39.2	44.5	24.5	26.4
1900	46.3	48.4	34.5	39.4
1901	24.1	32.1	15.6	22.2
1902	31.9	33.5	29.1	25.0
1903	43.5	47.1	32.8	34.3
1904	22.2	47.1	20.1	33.2
1905	35.9	41.5	28.7	30.8
1906	33.9	36.0	19.5	28.2
1907	28.0	33.2	18.7	19.1
1908	36.3	25.6	23.8	24.5
1909	40.1	34.8	20.4	25.7

It will be seen that the Wild Goose wheat surpassed both the Polish and the Seven Headed varieties in each of the past thirteen years without an exception.

Those farmers who pay high prices for the so-called new varieties of farm crops before the experiment stations thoroughly investigate the matter, have themselves to blame. The writer believes that there are not many farmers in Ontario who are led astray by the sensational advertising of farm crops with the object of enriching the promoters of these new and wonderful varieties. The Government of Ontario is doing much to protect the farmers by its extensive system of experimental work conducted at the Ontario Agricultural College and through the medium of the Experimental Union.

Varieties of Winter Rye.

Four varieties of winter rye have been grown at the College in each of the past six years. The following average results in yield of grain per acre and in weight of grain per measured bushel have been obtained: Mammoth White, 60.5 bus., 58.1 lbs.; Washington, 56.8 bus., 58.2 lbs.; Common, 53.5 bus., 57.3 lbs.; and Thousand Fold, 52.6 bus., 57.8 lbs. In 1909, the highest yield was produced by the Mammoth White, and the lowest by the Washington variety.

In the co-operative experiments with winter rye, the average yield of grain per acre of each of three varieties distributed in the autumn of 1908 was as follows: Mammoth White, 28.1; Common, 22.1; and Washington, 19.6. In the experi-

ments throughout Ontario, the Mammoth White surpassed the Common rye by an average of 5 bushels per acre in 1907, 5.4 bushels per acre in 1908, and 6 bushels per acre in 1909.

Varieties of Spring Rye.

Spring and winter varieties of rye are grown in Ontario to the extent of about 100,000 acres annually. The information obtained through the Bureau of Industries for the Province does not inform us regarding the comparative areas devoted to each of the two classes of rye. While it is probably correct to say that the greater acreage is devoted to winter rye, it might be said that the spring rye also forms one of the fairly prominent farm crops of the Province.

Five distinct varieties and two selected strains of spring rye were grown on our regular standard plots in the summer of 1909. Of this number, four have been grown for five years, one has been grown for four years, one for three years, and one was grown in 1909 for the first time. The following table gives the average results of the four varieties which have been grown for five years in succession:

Varieties.	Average results for 5 years.		
	Weight per measured bushel.	Tons of straw per acre.	Bushels of grain per acre.
	Lbs.		
Saatroggen	55.9	1.94	30.5
Prolific Spring	55.9	1.81	26.9
Common	55.9	1.76	26.6
Dakota Mammoth	55.5	1.73	26.2

The Saatroggen, which heads the list with an average of 30.5 bushels of grain per acre, has taken the lead in four out of the five individual years and occupied second place in 1906. It will therefore be seen that it is a very promising variety. The Saatroggen was secured in Germany when the writer was in that country in the year 1901. He made a trip of about seventy-five miles from Berlin to visit the greatest rye breeder of the country, and secured a supply of seed for growing in the experimental plots at Guelph. It is pleasing to notice that this variety has surpassed the Common Spring rye by an average of about four bushels of grain per acre and of a fifth of a ton of straw per acre per annum in the five year period. From this variety we have a new strain started from an individual plant which surpassed the parent Saatroggen variety by 4.5 bushels per acre in 1906, 1.3 bushels per acre in 1907, 3.4 bushels per acre in 1908, and 6.3 bushels per acre in 1909. It will therefore be seen that we have obtained, through importation, a spring rye which is quite superior to the common spring rye of Ontario, and from that new importation we have made a selection which is apparently quite superior to the variety from which it was selected.

Varieties of Buckwheat.

The acreage devoted to buckwheat in Ontario is almost double that used for the production of rye, and the number of acres seems to be gradually increasing. We find from the latest report of the Bureau of Industries for Ontario that the

acreage for buckwheat for 1909 was 176,630; for 1908, 140,605; and for the average of the past twenty-eight years, 104,646. We here present the average of five years' results in growing each of five varieties of buckwheat in the Experimental department:

Varieties.	Weight per measured bushel.	Straw per acre.	Grain per acre.
	Lbs.	Tons.	Bus.
Rye Buckwheat	53.3	2.1	34.0
Common Grey	47.1	2.6	24.5
Silver Hull	51.9	2 7	23 9
New Calcutta	50.8	2. 6	21.4
Japanese	45.6	2.6	20.1

Decidedly the highest average yield of grain per acre for the five year period has been produced by the Rye Buckwheat. This variety is grown extensively in Nova Scotia. It is sometimes called Sand, Notched, or Rough buckwheat. It is possibly true that this variety does not ripen quite as evenly as some of the other kinds and the crop is sometimes not quite as tall as that of the Japanese or the Silver Hull variety. Without any exception, however, in each of the past five years the Rye Buckwheat has surpassed in yield per acre each of the other varieties which has been grown in each of those years. It is interesting to note that the Rye Buckwheat has also taken the lead in weight of grain per measured bushel, but in yield of straw per acre it is less than that of any one of the other four varieties here reported.

VARIETIES OF FIELD PEAS.

Varieties.	Days to mature. Average of 13 years.	Length of vines. Average of 8 years.	Average results for 10 years.		
			Weight per measured bushel.	Straw per acre.	Grain per acre.
		Ins.	Lbs.	Tons.	Bus.
Early Britain	103	41	57.2	1.41	39.4
Potter	104	46	59.6	1.50	37.1
New Canadian Beauty	105	49	60.5	1.49	33.8
White Eyed Marrowfat	106	44	60.7	1.60	32.6
Black Eyed Marrowfat	106	44	59.7	1 45	32.6
Prussian Blue	108	48	59.9	1.64	30.1
Golden Viue	106	44	60.0	1.48	29.3
Multipliers	110	51	60.4	1.82	29 1

Owing to the ravages of the pea weevil in south-western Ontario for a period of several years, no experimental work was conducted with this crop in our experimental grounds. This was due largely to the fact that many farmers had stopped growing peas entirely and it was thought that with the united effort the pea weevil might be exterminated to a considerable extent. As the weevil has largely disappeared, the cultivation of the crop is again increasing throughout the Province.

In each of ten years, eight varieties of peas have been grown at the College under uniform conditions, and the yields per acre have been satisfactory and

furnish some good information regarding the comparative results of the different varieties which are presented in the above table.

The Early Britain, which has given the highest average yield of grain per acre for the ten years, is a brown pea which was imported from England by the Ontario Agricultural College and which has made a very excellent record throughout Ontario, as well as in the experimental plots at Guelph. Although the color is probably somewhat against this pea for market purposes, the writer has been informed that the grain is very suitable indeed for the manufacture of split peas, as the manufactured product has a rich yellow appearance after the brownish skin has been removed. The Golden Vine and the Multipliers, which are small white peas and are quite well known throughout Ontario, occupy the lowest places on the list in yield of grain per acre.

In 1909, thirty-two varieties of field peas were grown in the Experimental department. In this list, a number of new varieties received through the Department of Agriculture at Washington were included, and a few of them have made very good returns, two of them giving upwards of 50 bushels of grain per acre in the experiments of the past season.

Varieties of Field Beans.

Although field beans are not grown very extensively throughout the Province of Ontario, they form an exceedingly important crop in the counties of Elgin and Kent, there being no less than 422,951 acres in Kent and 142,571 acres in Elgin in 1908. No other county in Ontario had as high as 40,000 acres in the same year.

Eight varieties of field beans have been grown on the experimental plots for eleven years in succession, and we here present the average yield per acre and the average weight per measured bushel of each variety for the eleven year period.

Varieties.	Average results for 11 years.	
	Weight per measured bushel.	Grain per acre.
	Lbs.	Bus.
Pearce's Improved Tree	64.8	23.0
Burlingame Medium	64.4	21.7
White Wonder	64.7	21.0
Schofield Pea	65.1	20.9
Medium or Navy	64.8	20.5
Marrowfat	64.4	18.8
Small White Field	64.3	18.0
Large White Haricots	58.4	15.8

The Pearce's Improved Tree bean, which was named by the late J. S. Pearce, of London, Ontario, and the seed of which was originally obtained from Pearce's Seed House, London, Ontario, occupies the highest place in yield of grain per acre and is surpassed by only one other variety in weight of grain per measured bushel. While an average of twenty-three bushels of beans per acre may not seem a very heavy yield, it must be understood that in some of the eleven years the yields were comparatively light, while in others the yields were very much greater. The small white beans of the Pearce's Improved Tree variety are of good quality. The Small White Field beans are surpassed in yield by the Pearce's Improved Tree variety by an average of exactly five bushels per acre per annum.

Soy Beans.

The Soy beans, also known as Soja beans, are grown extensively in Japan, but they never received very general cultivation in America, except possibly in a few places in the United States. The crop furnishes exceedingly rich feed for farm stock and the plants may be cut and converted into silage or they may be allowed to ripen for the production of grain. Although there are a large number of varieties of Soy beans, the most of them require a long season to reach maturity and are quite unsuited for cultivation in Ontario. Although varieties have been obtained by the Agricultural College on various occasions, extending back for fully sixteen years, only two kinds have become at all prominent in our experimental work, viz., the Early Yellow and the Medium Green. The Early Yellow variety has proven to be one of the best for most parts of the Province as it yields very well and matures early. In the average results of growing the Early Yellow Soy beans at the College in each of fourteen years, we have obtained 14.8 or practically 15 bushels of threshed seed per acre.

In 1909, no less than sixteen varieties of Soy beans were grown in the Experimental department. A number of these were tested during the past year for the first time. The season was quite unfavorable for the growth of the Soy beans in Ontario, the heaviest yield per acre being produced by the Early Yellow variety, which was only a little over 13 bushels per acre. The Brown Soy beans gave 11 1-2 bushels, the Tsurunoko variety 10.7 bushels per acre, and the Chernie variety 6.5 bushels per acre. The other varieties produced even less yields than these and some of them furnished practically no seed.

Varieties of Flax.

In each of five years, experiments have been conducted at the College in the growing of flax from seed which was originally obtained from Ontario, Manitoba, Holland, and Russia. Six different quantities of seed per acre were used with each of the four varieties in each of the years referred to. The average results of the six plots of each lot of flax for the five years are as follows:

Varieties.	Average Results for 5 Years.		
	Average Weight per Measured Bushel.	Straw per Acre.	Grain per Acre.
	Lbs.	Tons.	Bus.
Manitoba	54.5	2.10	20.0
Common	54.4	2.00	18.9
Russian	54.9	1.93	17.3
Holland	54.5	1.97	15.0

It will be observed from the table that the flax seed obtained originally from Manitoba has been the one which has given very good results indeed in furnishing a strain of flax which has surpassed the next highest yielding strain or variety by 1.1 bushels per acre.

Besides the four kinds of flax just referred to, we had six other different lots under experiment in 1909, some of which were grown this year for the first time. Amongst these varieties, two were obtained from the Argentine Republic, one from Germany, one from Holland, and one from Minnesota. Of these different lots, the two from the Argentine Republic are the most promising.

Varieties of Millet Grown for Seed.

Twenty-two different varieties of millet were grown in the Experimental department in 1909. Of this number seven were grown this year for the first time, and the others have been grown for two years or more. The following table gives the average yield of seed per acre of five years' experiments with each of seven different varieties:

Varieties.	Average results for 5 years.	
	Weight per measured bushel.	Grain per acre.
	Lbs.	Bus.
Siberian	54.6	51.6
Steel Trust	54.4	47.2
Hungarian	54.2	46.4
Holy Terror Gold Mine	51.5	44.7
Golden Wonder	52.7	38.2
German or Golden	53.9	36.4
Common	53.5	35.3

It will be seen that the Siberian variety of millet is a very heavy producer of grain, the yield for the five years being 51.6 bushels per acre per annum. Although 48 pounds is the standard weight for millet and the weight used in compiling these results, it will be seen that the average measured bushel of the Siberian millet weighed 54.6 pounds in the average of the five years' experiments. This is the heaviest weight per measured bushel of the seven varieties under test. The Hungarian Grass, which is well known throughout Ontario, gave an average yield of 5.2 bushels per acre less than the Siberian variety. The Common millet came at the bottom of the list with an average of 16.3 bushels of seed per acre less than that produced by the Siberian.

In the experiments of 1909, the greatest yields of seed per acre were produced by the Siberian, 38.1 bus.; the Hungarian Grass, 27.7 bus.; the Steel Trust, 25.8 bus.; the Holy Terror Gold Mine, 25.2 bus.; and the Common, 23.6 bus. Besides these, some of the selected strains did exceptionally well. One selected strain of the Siberian gave 41.6 bushels, which was the highest yield produced by any variety of millet in 1909.

Hairy Vetches for Seed Production.

During recent years, the Hairy Vetches have been considerably advertised for use as a farm crop. They have yielded well as a fodder crop, have furnished a considerable amount of pasture, and have been very highly spoken of as a cover crop for fruit orchards. The seed, however, is nearly all imported from across the Atlantic and is very expensive, costing from five to six dollars per bushel, and for general purposes from one bushel to one and one-half bushels of seed per acre are required. In each of the past eight years, the Hairy Vetches have been sown in the autumn and allowed to ripen in the following year, in connection with our experimental work at the College. In the average results of eight years, we obtained five bushels of the seed per acre per annum, and the yield for 1909 was exactly five bushels per acre. The yield is somewhat irregular, as in 1903 it was 18.2 bushels and in 1908 it was less than one bushel per acre. We find, however,

by continuous growing of the Hairy Vetches and by thus using Canadian grown seed, we get decidedly better results than we do from seed which has been freshly imported.

Winter Emmer.

Although a number of varieties of spring emmer have been under experiment at the College, only one variety of winter emmer has been introduced and tested. The variety obtained is one which has given exceptionally good results in the experiment stations of some of the Western States, such as the one at Kansas. The Black Winter emmer has now been under experiment at Guelph for three years in succession, and the average results are as follows: Weight per measured bushel, 31.9 lbs.; yield of straw per acre, 1.5 tons; and yield of grain per acre, 2,055 lbs. In 1907, the Black Winter emmer produced 3,050 pounds of seed per acre, while in 1909, it gave only 1,388. The weather of the past season seemed to be quite unfavorable for the production of the winter emmer.

Sunflowers for Seed.

While it is true that sunflowers are not grown to any great extent as an economic crop in Ontario, they are, nevertheless, large producers of seed, as will be seen from the results here presented. Seven varieties of sunflowers were tested in the Experimental department, and after five years all were discarded with the exception of three which have now been under experiment in each of the past eleven years. Taking the standard weight for sunflower seed as being 20 pounds per measured bushel, we have obtained a yield in the average of eleven years of 72.9 from the White Beauty, 72.8 from the Mammoth Russian, and 69.0 from the Black Giant. These are certainly large yields per acre, but probably not much larger than might be expected from growing sunflowers under fairly good Ontario conditions. For this experiment, the seed was planted about the same as corn. Some farmers harvest the heads of the sunflowers and run them through the cutting box along with corn when filling the silo, considering that the silage is improved in quality thereby, owing to the fact that the sunflower heads contain a large amount of oil. The seed is quite frequently used as feed for poultry.

Sorghums for Seed.

Although eighteen varieties of sorghum were grown in the Experimental department in 1909, only seven of these varieties matured seed. The greatest yields were produced by the Australian Broom Corn, 19.4; the Improved Evergreen Broom Corn, 15.5; and the Early Amber Sugar Cane, 11 bushels per acre. In the average of seven years, we have obtained yields per acre as follows: Early Japanese Broom Corn, 26.9 bus.; California Broom Corn, 25.6 bus.; and Improved Evergreen Broom Corn, 26 bus. per acre. Some of the varieties of sugar cane have given very good results indeed in some seasons, but the sugar canes are not as productive of seed at Guelph as they are on some of the lighter soils of Ontario, especially where the season is a little longer than it is at Guelph.

Varieties of Corn for Husking.

Although the south-western part of Ontario, including particularly the counties of Essex, Kent, Elgin, Lambton, and Middlesex, is the section of the Province which produces a large amount of corn for husking, yet a number of the other

counties, especially along Lake Erie and Lake Ontario, grow a considerable amount of corn for grain production as well as for fodder purposes.

One hundred and nineteen varieties of corn were grown in the Experimental department in 1909. A number of these did not mature the grain and had to be judged entirely from the standpoint of fodder production. As fourteen varieties of corn have been grown for grain production for five years in succession, the average results for the five year period are here presented for each of these fourteen varieties.

Varieties.	Color of Grain.	Average number of rows per ear.	Average results for 5 years.			
			Number of days until in full tassel.	Height of plants.	Percentage of cob.	Grain per acre.
				Ins.		Bus.
White Cap Yellow Dent	Yellow	14	82	101	21	66.1
Golden Dent	"	14	82	102	21	62 5
Wisconsin Little Dent	"	14	77	93	23	62.5
University No. 13	"	16	83	101	24	61.8
Genesee Valley	"	8	82	96	26	58 2
King Phillip	Red	8	84	97	27	57.9
Eight-rowed Yellow	Yellow	8	83	98	27	56.6
Earliest of All White Dent	White	12	76	78	23	55 3
Red Blazed	Red and Yellow	8	82	96	26	54.7
Compton's Early	Yellow	12	86	101	31	52.2
Canada Yellow	"	8	85	96	28	50.9
Longfellow	"	8	86	97	27	49.6
Farmer's Friend	"	8	77	75	22	49.5
Salzer's North Dakota	White	8	90	100	33	46.0

The White Cap Yellow Dent, which heads the list in yield of grain per acre, is a dent corn which is grown quite extensively in Ontario and particularly in the south-western part. It is much earlier in maturing than some of the large varieties of dent corn which are suitable for the southern or central states, but are not so valuable in Ontario. The White Cap Yellow Dent matures its seed very well on the warmer soils in southern Ontario and can be grown successfully farther north for fodder purposes. Of the varieties here mentioned in the list, five belong to the dent and the remainder to the flint class. Of the flint corns, the Genesee Valley has given the highest yield of grain per acre, yielding 58.2, while that of the Compton's Early, a well known Ontario variety, is exactly six bushels per acre less.

Different Strains of the White Cap Yellow Dent Corn.

The White Cap Yellow Dent corn, which occupies the highest place in yield per acre of the varieties reported in the foregoing table, requires a more careful study. In order to get fuller information regarding different strains of this variety of corn which has been produced through selection by growers for a number of years in succession, seed was obtained from different sources in south-western Ontario. We regret that, through different causes, we have been compelled to drop several of these strains, but we still have three of them under competition for the

last three years in succession. The following table gives the average results of the two tests conducted in each of the past three years in average height and total yield per acre, and also of the duplicate tests conducted in each of the three years for grain production.

County.	Grower.	Average results for 3 years.				
		Number of days until in full tassel.	Height.	Per centage of cob.	Total crop per acre.	Grain per acre.
			Ins.		Tons.	Bus.
Essex	J. Hammond	79	106	23	13.60	46.2
Middlesex	E. M. Zavitz	79	112	28	15.17	44.5
Essex	J. Thomas	82	111	25	14.02	39 3

It is plainly seen that there is quite a marked difference in these three strains of White Cap Yellow Dent corn. The first two strains appear to be equal in maturity, but the first is a little higher in yield of grain per acre, and the second in production of total crop which would include the stalks and the leaves as well as the unhusked ears.

Varieties of Potatoes.

In 1909 there were 169,695 acres of potatoes in Ontario, resulting in a total production of 24,645,283 bushels, or an average of 145 bushels of potatoes per acre. This yield is 34 bushels per acre above the average yield of potatoes per acre in Ontario for the past 28 years.

Inquiries were made during the past year of farmers throughout Ontario regarding the varieties of potatoes which were most extensively grown in the different localities in the Province. The following gives the names and the order of varieties grown: 1. Rural New Yorker No. 2; 2. Empire State; 3. Carmen No. 1; 4. Beauty of Hebron; 5. Early Rose; 6. Delaware; 7. American Wonder; 8. White Elephant; 9. Early Ohio; and 10. Carmen No. 2. From inquiries made in each of the past three years, the Rural New Yorker No. 2 has been mentioned first and the Empire State second each year as the varieties which are the most extensively grown in Ontario. If the farmers in a locality would select for their general crop a variety which would be likely to produce large yields of salable potatoes of good quality, they would be almost sure to get a more ready market and obtain higher prices than by growing a large number of varieties and thus making it so difficult for buyers to secure carloads of uniform lots. In order to give potato growers in Ontario as valuable information as possible regarding the different varieties a large number are tested annually in the Experimental grounds at the College. In 1909 no less than 133 varieties were under test. The greater number of these have now been grown for, at least, five years in succession. Owing to a considerable amount of rot in some of the years, we have found it difficult to place the results in tabulated form so that the information would be accurate and not liable to be misunderstood. We are, however, obtaining valuable information regarding these varieties from year to year. Not only are the potatoes grown under very careful and uniform conditions and the yields determined, but many observations are made

regarding the various characteristics of the different varieties, as for instance, in the average of three years tests, it was ascertained that some varieties were comparatively free from rot, viz., the Robertson's Champion, 3.1 per cent.; Stray Beauty, 3.2 per cent.; Early Pinkeye, 3.6 per cent.; and Holborn Abundance, 4.1 per cent.; while other varieties were very subject to the attacks of rot, as for instance, the White Pinkeye, 37.4 per cent.; Hanlan Beauty, 37.9 per cent.; Beauty of Hebron, 37.8 per cent.; and Montana Bluff, 41.8 per cent.

Both in connection with the results at the College and in the co-operative experiments over Ontario the following varieties have given excellent returns in yields of potatoes of good quality; of the late varieties, Empire State, American Wonder, and Rural New Yorker No. 2; of the medium ripening varieties; Burpee's Extra Early and Rose of the North; and of the early varieties; Early Eureka, Early Puritan, and Early Fortune. Of these varieties, particular attention is drawn to the Empire State as being a variety of potatoes which does exceptionally well in many localities throughout the Province. It is a white potato, oval in form, good for market purposes, the yield per acre is high, the percentage of small potatoes is low, and the table quality is excellent. The Empire State is a finer grained potato than the Rural New Yorker. When the last named variety is grown on sharp, warm soil, the quality is usually good, but when grown on rich loamy land the potatoes are apt to be large, coarse, and frequently hollow. The Early Eureka is also a white potato and amongst the very early varieties; this variety has proven to be one of the best yielders and one which is of very good quality and has a comparatively low percentage of small potatoes. The writer again wishes to call attention to the importance of the farmers confining their energies more particularly to the careful selection and the successful growing of a few of the very best varieties instead of dividing their attention over such a great number of different kinds, some of which are of poor quality, sell for comparatively low prices and often give poor results.

Treatment for the Potato Beetle.

In order to test the influence of different treatments for the Potato Beetle, six lots of each of two varieties of potatoes were carefully selected and planted on separate plots, in each of five years. After the potatoes had made sufficient growth and the Potato Beetles (Bugs) had made their appearance, five plots of each variety were treated in different ways, to destroy the beetle, and one plot of each variety was left untreated, as a basis of comparison. The five treatments made in each of the years were as follows: (1) Paris Green and water, by using one pound of Paris Green and 96 gallons of water per acre; (2) Paris Green and plaster, by using one pound of Paris Green and 38 pounds of plaster per acre and applying the mixture to the potatoes in the dry condition; (3) Bug Death finish, which was applied dry at the rate of 20 pounds per acre; (4) Bug Death and water, by using on an average, 32 pounds of Bug Death and 96 gallons of water per acre; and (5) Bug Death used in the same proportion as No. 4, but in the dry condition. Three applications of each of the five treatments were made with each of the two varieties of potatoes. In the autumn, the potatoes from each of the twelve plots were dug and weighed. The average results of the experiment conducted for five years in succession, showing the yields in bushels per acre from each treatment, are as follows: Bug Death and water, 211.4; Bug Death dry, 203.5; Paris Green and water, 199.6; Paris Green and plaster, 183.3; Potato Bug Finish, 145.3; and untreated, 104.3.

In eight out of the ten tests made during the five years, those potatoes which were sprayed with Paris Green and water surpassed those which were dusted with Paris Green and plaster in yield of crop per acre. It will also be observed that the Bug Death and water gave better results than where the Bug Death was used in the dry condition. The Bug Death in solution gave considerably larger yields of potatoes per acre than the Paris Green and water. From the potatoes which were left untreated and on which the potato beetles were allowed to work unmolested, there was less than half the yield of potatoes, as compared with the crop produced from the treatment with Bug Death and water. The usual prices of these insecticides when bought in quantity are about as follows: Paris Green 20 cents; Bug Death, 7 cents; and Potato Bug Finish, 1 2-3 cents per pound. The cost, therefore, for the material used in the experiments conducted in the last five years was about as follows: Paris green and water, 60 cents; Paris green and plaster, 88 1-2 cents; Bug Death, $6.72; and Potato Bug Finish, $1.00 per acre.

In 1909, an experiment was conducted in the Experimental Department for the first time by the use of different proportions and different preparations of lead arsenate in comparison with Paris green for the prevention of the ravages of the potato beetle. As only one year's work has as yet been conducted with this treatment, it sufficeth to say that the greatest yields per acre were produced from the lead arsenate used in quantities of two and three pounds per acre with 40 gallons of water in each case. When the amount of lead arsenate per acre was three pounds, the yield was 217 bushels, and when it was two pounds the yield was 212 bushels per acre. The next highest yield of potatoes from the eleven different treatments was obtained from Paris green at the rate of 1 1-2 pounds per acre when used with 40 gallons of water, the yield being 202 bushels of potatoes per acre. The entire experiment was conducted in duplicate with each of two different varieties of potatoes and it is the intention to repeat the experiment in 1910 and we hope to obtain some valuable results from these investigations.

Bordeaux Mixture for the Potato Blight.

In each of the past three years, early, medium and late potatoes have been sprayed in different ways with two different solutions of the Bordeaux mixture. In reference to these two solutions the following quotations are made from the College Bulletin No. 154:

"The first thing to do in the manufacture of the Bordeaux mixture is to decide on some recommended formula. The formula which has long been advocated in Ontario is known as the 4-4-40 formula. It is as follows:

$CuSO_4$ (crystallized copper sulphate)	4 pounds.
CaO (quick lime)	4 "
Water	40 gallons.

"With good lime it only needs about one pound to act on all the copper; the excess given, three pounds, covers all danger which might arise from the use of a poor article. A large excess of lime is a disadvantage, it causes the Bordeaux mixture to exert a slow fungicidal action, it is apt to cause the machinery to clog and to cause an uneven application, and the particles of lime offering more resistance to rain, will cause the mixture to be more rapidly washed from the trees. It may be an advantage, however, in a very wet season, by causing the Bordeaux to retain

its efficiency longer and by allowing less injury to be done to foliage. Orchardists are inclined to use a less proportion of lime, and the following formula is recommended:

$CuSO_4$ (crystallized copper sulphate)	6 pounds.
CaO (quick lime)	4 "
Water	40 gallons.

"As both copper sulphate and lime dissolve and slake, respectively, much quicker in hot water than cold, it is better to use heated water in order to save time. The very best lime obtainable is used, and if freshly burned, all the better. In slaking do not use an excess of water, but just enough to keep the lime moist. When the action is completed enough water is added to make a thin whitewash and then the whole is strained through coarse sacking to remove any lumps which would clog the nozzle of the spray pump. This done, enough water is added to make the volume up to one-half of what the final mixture will amount to. The copper sulphate solution is diluted to the same extent. The two are now mixed, the operation being best performed by two men, each with a bucket, one handling the lime and the other the copper sulphate. They are poured into the spray tank, two bucketsful at a time, until the whole is brought together. In this way a precipitate is obtained which will remain in suspension with only occasional agitation. If mixing is done before dilution, a very coarse precipitate is formed which settles rapidly to the bottom of the spray tank and requires almost constant stirring.

"If large quantities of spray mixture are going to be used, it is an excellent plan to make up "stock" solutions of the copper and lime. This can be done by dissolving, say, one pound of copper sulphate in each gallon of water and making up a barrel full of it. Each gallon of the solution taken then represents one pound of the bluestone. The salt can be conveniently dissolved by filling the barrel with water and then suspending it therein, enclosed in a canvas sack. The lime can be handled in the same way, being sure, of course, that the contents of the barrel are thoroughly stirred up before dipping out any portion. Keep the barrels covered when not in use.

"Before Bordeaux mixture is sprayed, it is absolutely necessary that all copper should be in the form of the sky-blue precipitate, *i.e.*, enough lime must be used to act on all the bluestone. Formulæ advocated by the experiment stations always contain enough lime to precipitate all the copper, but it may sometimes happen that such a very poor quality is used that there will be some of the sulphate left unchanged. There are several simple ways by which one can tell when enough lime is present. Those who are very familiar with the reaction which occurs can tell by the color of the precipitate, it having a greenish tinge when an insufficiency of lime is present instead of the deep sky-blue color. However, those who are not familiar with the process must use more decided tests. Three simple ones can be employed as follows:

"1. Take some of the clear solution which is left on top when the sediment settles and place in a white saucer. Add a few drops of a solution of potassium ferrocyanide to it. If a reddish-brown precipitate or coloration appears, more lime is needed.

"2. Take a portion of the clear fluid as before, and blow the breath gently over the surface. If a thin white pellicle or covering forms over the top, enough lime has been added.

"3. Take a bright piece of steel, such as a knife blade, and hold it in the mixture for a minute or more. If it becomes coated with copper more lime is required.

"Test number one is the most reliable and is the one recommended.

"In handling copper solutions use only wooden, brass or copper vessels; all other receptacles would be corroded and destroyed by them; besides, the fungicide itself would be injured.

"Copper compounds are poisonous and therefore should not be left lying around where children and animals can get at them."

In the experiments of the past three years one plot of each variety of potatoes was left unsprayed, one plot was sprayed on top of the vines 2 times; one 3 times; one 4 times; and one 5 times. Another plot was sprayed 3 times both on top and underneath the vines. The average of the three years results show that the two sprayings exerted but little influence on the crop, but there was an average increase in the yield per acre of 12 bushels from three sprayings, of 20 bushels from four sprayings, and of 25 bushels from five sprayings. When the potato vines were sprayed both on top and underneath the leaves there was an increase over the unsprayed of 22 bushels per acre or nearly as great as from the five sprayings which were made on the top of the vines.

Other Experiments with Potatoes.

Besides experiments here enumerated others were conducted in the treatment of the potatoes for scab, the planting of potatoes at different dates, etc., the results of which can be reported to better advantage at another time.

The Growing of Root Crops in Ontario.

That root culture lies at the basis of good husbandry is the candid opinion of many successful farmers of long experience. The root crop occupies an important place in the rotation, furnishes an excellent means for cleaning the land, prepares a splendid seed bed for a cereal crop, and supplies a large amount of succulent and palatable winter fodder which is rich in valuable food constituents which are easily digested by the animals. Roots assist greatly in the economical feeding of grain and coarse fodder, such as hay, straw, fodder corn and corn silage with which they are used. Root crops, in general, are much relished by all kinds of farm stock, but of special service are both swede and fall turnips for young stock and fattening animals, mangels for dairy cows, breeding ewes and hogs, carrots for horses, and sugar beets for cattle and hogs.

The growing of roots as a feed for farm stock has received much attention in many of the European countries. The root crop, however, has never been developed to the same extent in America, owing, no doubt, to the large areas devoted to corn in certain sections and to the adaptability of the soil to grain crops throughout a considerable part of both the United States and Canada. In the Northeastern States and in Ontario, Quebec and the Maritime Provinces, however, the field roots occupy an important place in the agricultural production. In some sections of America, the area devoted to the root crop is increasing from year to year. In order to illustrate this point, I would draw your attention to the increase in the area devoted to the mangel crop in the Province of Ontario. This increase can be observed from a study of the number of acres used for mangels in each of a number of the past years, as follows: 1882, 15,791; 1887, 17,924; 1892, 22,026; 1897, 41,175; 1901, 61,095; 1908, 67,937. During the same period of twenty-six years, the area devoted to turnips increased from 78,823 in 1882 to 120,920 acres in 1908. Within the last few years, however, the area used for turnips has been

decreasing, and that for mangels increasing to a considerable extent, owing, no doubt, to the greater development of the dairy industry, in connection with which the mangels prove more serviceable than the turnips.

According to the reports of the Bureau of Industries for Ontario, we learn that the average yields per acre of our principal classes of field roots in Ontario have been as follows: Mangels (26 years), 460 bus.; Turnips (27 years), 429 bus.; Carrots (26 years), 346 bus. If we apply the best information which we have regarding the composition and the digestibility of the roots to the average yields here presented, we obtain the information embodied in the following table:

Classes.	Digestible matter per acre, lbs.		
	Dry Matter.	Protein.	Carbohydrates.
Mangels	2,484	304	1,546
Turnips	2,934	257	2,188
Carrots	2,284	166	1,702

These results show that while the turnips stand the highest in the amount of digestible dry matter and of digestible carbohydrates, mangels are at the top of the list in furnishing a large yield of digestible protein. It should be mentioned that the turnips, as here reported, include both the Swede and the soft varieties, but the latter are grown to a comparatively small extent in the Province of Ontario. The results here presented furnish some interesting information of a general character, but it should be kept in mind that in some parts of the country one class of roots will thrive admirably, and in another part of the country another class of roots will give more satisfactory returns.

Canadian Grown Root Seed.

Nearly all the seed of field roots, which is used in Ontario, is grown in Europe. From certain preliminary experiments and observations which we made previous to the year 1905, we obtained the impression that root seed produced in this country was likely to give very satisfactory crops. During the last three years, we have carried on systematic work in the production of seed of mangels, Swede turnips and carrots, and have been testing the seed so produced with seed of similar varieties which has been imported. In the autumn of each of the past four years, roots were selected and stored during the winter and were replanted in the spring. Some of each class of roots were pitted in the fall, some were stored in piles in the root cellar, and some were placed in sand. We have, however, found it difficult to pit a small quantity of roots and have the roots under the same conditions as those which have been pitted in large quantities. In the other methods of storing, we found we could obtain practically as good results when the roots were stored in loose piles in a cool cellar as when they were packed in sand, but there was less mould and sprout in the early spring from the latter than from the former method.

During the past few years we have obtained some very good results indeed from home grown root seed. The home grown mangel seed proved to be higher in germination and was more productive of roots than the seed which was imported.

The Ontario grown mangel seed surpassed the imported seed in yield of roots per acre in 1907, and also in 1908. In the autumn of 1907, the mangel seed did not ripen as evenly as in the year previous, some of the plants producing but little ripened seed. In the fall of 1908, however, all kinds of root seed matured very well.

In 1909, thirty-five lots of mangel seed were sown in the Experimental Department. Of these thirty-five lots, thirty were seed grown in Europe and five were seed grown in Ontario, four at the College and one at Waterloo. The first seeding took place on May 21st. Of each variety three rows, one chain in length were used. As the rows were 3⅓ links apart there was exactly 1-100 of an acre in each of the thirty-five plots. The seed was planted with great care by placing exactly four clusters of seed every ten inches in the row. There would, therefore, be 948 mangel clusters, that are usually called seeds, of each plot planted. After the mangel seed had made a growth, careful observations were made and it was seen that the European seed was much poorer in germination than that produced in Ontario. In order to study the germination of these different lots of mangels more carefully, the thirty-five varieties and strains were again planted on June 12th in exactly the same way except that the plots were made smaller in size. Again on June 25th all the different varieties and strains were sown in two sets. In one set the mangel clusters were sown separately and in the other, two clusters were planted in each place. These four different sets sown on the three separate dates gave an excellent opportunity for studying the germination of the mangel seeds under field conditions. As the germination of nearly all the European seed was so poor no results can be furnished regarding the comparative yields of the different varieties. The experiment is confined almost entirely to the germination of the seed which was carefully determined in each set which was sown. The results were very similar throughout the four separate tests and showed marked differences in the germination of the seed of the different varieties and also of the European seed as a whole as compared with that which was grown in Ontario. Of the thirty-five different varieties and strains under experiment the first, second, third, sixth, and ninth lots in germinating power were from Ontario grown seed, but all the rest were from seed obtained from seedsmen in Ontario, United States, Great Britain, and the Continent of Europe. The highest germination was from Ontario seed and amounted to 174 per cent., while the lowest was from imported seed and amounted to only 15 per cent. Each of the twenty-three varieties which gave less than 100 plants from 100 seed clusters was imported seed. The seed of the six varieties which gave the lowest germination of all was imported by Ontario seedsmen and purchased from them by the College in the spring of the present year. It seems to us that this is a very serious problem as the mangel crop is becoming of greater importance in Ontario from year to year. The poor germination of the mangel seed in 1909 may account for the fact that the yield was 46 bushels per acre less in that year than in the average of the past 28 years. As a large amount of seed is usually sown per acre on the farms in Ontario there must have been many blanks in 1909 to bring the average down to 410 bushels per acre. It would certainly be wise for Ontario farmers to carefully test their mangel seed before they sow their crop in the spring of 1910.

Yellow Leviathan Variety of Mangels.

The variety of mangels known as the Yellow Leviathan has given exceptionally good results in the experiments at the College and also in the co-operative experi-

ments conducted throughout Ontario. The Yellow Leviathan has been reported as standing the highest in the average yield per acre of several years' tests at the College. Owing to its high yielding qualities and also from the fact that the Yellow Leviathan is a compact, yellow, intermediate mangel of good form and easily handled, it has been tested more extensively during the past two years.

In the spring of 1909, seed of the Yellow Leviathan mangel was obtained from all those seedsmen in Ontario, who advertised this variety in their catalogue, copies of which were furnished us at time of ordering the seed in the spring of the year. As we also used this variety for seed production at the College we were enabled to conduct an experiment with different lots of home grown seed along with those obtained from the Ontario seedsmen. Four different tests were made with these eight lots of Yellow Leviathan mangel seed in the past season. Number one lot was seed produced by mangels which had been stored in sand; number two lot was seed from mangels which had been stored in a loose heap in the cellar; number three lot was seed from a single plant; and number four was also seed produced by a single plant. The following table gives the total number of plants produced from 1,172 mangel seed clusters, and also the average percentage of germination in the field of the four sets which were planted on three separate dates:

Varieties.	Number of Plants Produced from 1,172 Seed Clusters Planted.	Percentage of Germination in the Field. Average of 4 sets. 3 Dates of Planting.
Yellow Leviathan (O. A. C. grown seed, lot 4)	1,776	152
Yellow Leviathan (O. A. C. grown seed, lot 2)	1,663	142
Yellow Leviathan (O. A. C. grown seed lot 1)	1,384	118
Yellow Leviathan (O. A. C. grown seed, lot 3)	1,287	110
Yellow Leviathan (Steele-Briggs)	992	85
Yellow Leviathan (Ferry)	990	84
Yellow Leviathan (Hewer)	796	68
Yellow Leviathan (Rennie)	484	41

It will be seen that there is a marked difference in the germination of the Yellow Leviathan mangel seed obtained from different sources. The germination of the Ontario grown seed was better than that of the European seed in every instance.

Varieties of Sugar Beets.

There are two different classes of sugar beets grown in Ontario, one for the production of feed for farm stock and the other for the production of sugar. With the first object in view, the varieties mostly grown have roots of good size which grow considerably out of the ground and contain about 10 per cent. of sugar. When the object is sugar production those varieties are grown whose roots grow almost entirely under the ground and which contain on an average about 15 per cent. of sugar. The roots of the varieties grown for sugar production are also considerably smaller than those grown for feeding on the farm.

Twelve varieties of sugar beets, which include the two classes previously referred to, have been grown in the Experimental department in each of the past five years. All the varieties were grown in rows 21 inches apart and the roots

were thinned to seven inches apart in the rows. The following table gives the average results in tons of roots per acre and also gives the percentage of sugar as determined in the Chemical department at the College:

Varieties.	Length in inches.		Percentage of Sugar.	Yield per acre.
	Above Ground.	Under Ground.		
				Tons.
Bruce's Giant White Feeding	3.9	4.5	8.1	26.3
Rennie's Tankard Cream	3.2	4.4	*8.6	22.6
Steele-Briggs' Royal Giant	2.9	5.1	10.2	22.0
Simmers' Imperial Giant Half Sugar	2.9	5.2	†10.6	21.9
Bruce's Giant Rose Feeding	3.0	5.0	13.0	20.8
Rennie's Giant Sugar	2.8	5.1	†10.3	20.4
Rennie's Danish Improved	2.7	5.2	11.1	20.1
White Silesian	.9	6.0	13.7	18.5
Red Top	1.4	5.9	11.2	18.0
Champion	.8	6.4	15.7	17.4
Improved Imperial	.6	5.8	16.8	15.8
Rubensamen (Type A)	.5	5.9	*17.3	14.0

*Average for 4 years. †Average for 3 years.

The Bruce's Giant White Feeding has given decidedly the largest average yield of roots per acre in the report here presented. It will be noticed that the sugar content, however, is the lowest of all the varieties here tabulated; in fact, as a general rule, as the yield per acre decreases the sugar content increases, although there are a few slight exceptions to this rule.

Of the twenty-three varieties of sugar beets grown in 1909, the greatest yields per acre were produced by the Rennie's Jumbo, 21.1 tons; Tankard Cream, 19.9 tons; Bruce's Giant White Feeding, 19.0 tons; Giant Half Sugar White, 17.9; Steele-Briggs' Giant White, 17.8; Royal Giant, 17.4; Keith's Prize Winning Half Sugar, 16.9; Bruce's Giant Rose Feeding, 16.8; Rennie's Giant Sugar, 16.6.

Varieties of Swede Turnips.

Twenty-three varieties of swede turnips were grown in the Experimental department at the College in 1909. The yields per acre were rather light, the largest yields in tons per acre being as follows: Carter's Invicta, 17.1; Keepwell, 17.0; Cropwell, 16.9; Improved Purple Top Yellow, 16.7; and Rennie's Prize Purple Top, 16.4.

Five varieties of swede turnips have been grown for seven years and the following are the average yields per acre in tons of roots: Hall's Westbury, 20.3; Sutton's Magnum Bonum, 19.0; Kangaroo, 18.4; Hartley's Bronze Top, 18.2; and Buckbee's Giant, 18.1.

Varieties of Fall Turnips.

In 1909, eleven varieties of fall turnips were grown at the College. The yields were considerably lower than usual. The five varieties which gave the highest yields in tons per acre in 1909 were as follows: Sutton's Imperial Green Globe, 18.7; Sutton's Purple Top Mammoth, 17.5; Sutton's Centenary Green Top Hybrid, 16.1; Red Top White Globe, 15.9; and Cow Horn, 15.4.

The three leading varieties of fall turnips have now been under test in each of eight years. The average results for the eight year period in yield of roots per acre are: 25.7 tons for the Red Top White Globe; 20.8 tons for the Early American Purple Top; and 19.5 tons for the Cow Horn.

Varieties of Field Carrots.

Sixteen varieties of field carrots were grown at the College in 1909. Of this number eleven varieties have been grown for five years in succession. The average results in length of roots and in tons of roots per acre for each of the eleven varieties for the five year period are as follows:

Varieties.	Color.	Length of roots.	Yield per acre.
		Ins.	Tons.
Steele's Improved Short White	White	8.4	28.0
Mastodon White Intermediate	"	8.7	27.4
Simmer's Improved Giant Short White	"	8.4	27.0
Bruce's Mammoth Intermediate Smooth White	"	8.3	26.9
Carter's Hundred Ton	"	8.2	26.0
Large White Vosges	"	6.6	23.3
Rubicon Half Long Red	Red	5.9	22.9
Large White Belgian	White	11.0	22.7
Carter's Gate Post Orange Long	Yellow	8.8	21.5
Sutton's Magnum Bonum	Orange Red	8.8	20.6
Kirsche Carrot	Yellow	7.0	18.4

It is interesting to note that all the leading varieties of carrots are those of the white intermediate type, and that each of these varieties produced an average of several tons of roots per acre more than the Large White Belgian variety, which used to be grown extensively. Not only do the short white varieties give a greater yield per acre, but, owing to their compact form, they are very much easier harvested and more convenient for handling.

Varieties of Kohl Rabi.

Kohl Rabi resembles cabbage in its root and Swede turnips in its leaf growth. The valuable part grows about three inches above ground in the form of a bulb. The kohl rabi, when used for domestic purposes, is prepared in much the same way as Swede turnip. When grown as a food for stock it is harvested and stored somewhat similar to mangels and turnips, although the crop is sometimes pastured off in the field. The kohl rabi is grown only to a limited extent in Ontario. Four varieties were tested in the Experimental department in 1909, the greatest yield being produced by the Earliest Erfurt, which gave thirteen tons of roots per acre. Three varieties of kohl rabi have now been grown under test at the College in each of eight years and the average yields of roots per acre is as follows: Earliest Erfurt, 18.6 tons; Early White Vienna, 18.3 tons; and Goliath Purple, 15.4 tons.

Varieties of Parsnips.

Although parsnips have not been grown in Ontario to any great extent as a food for stock, enquiries have been received and some articles have been written

regarding the value of this class of roots as a producer of food for domestic animals. In order to obtain more information on the growing of parsnips with the object of feeding the same to farm stock, experiments with a few varieties have been conducted at the College during recent years. The most of these have now been dropped and only two were included in the tests in 1909. As these two varieties have been grown in each of five years we here present the average yield of roots per acre for the five year period: New Ideal Hollow Crown, 10.2 tons; and Sutton's Cattle, 9.7 tons.

Varieties of Corn for Green Fodder, Dry Fodder, or the Silo.

The corn crop, although not occupying as large an area as the oat, wheat, or barley crops in Ontario, nevertheless occupies an exceedingly important place in the agriculture of the Province, especially in the south-western part. The area devoted to the fodder corns in Ontario was 200,354 acres in 1907, 233,753 acres in 1908, and 288,346 acres in 1909, according to the latest report of the Bureau of Industries for the Province of Ontario. The average total yield of green corn per acre in 1909 was 11.7 tons, and that for the past eighteen years 11.45 tons per acre. The fodder corns are largely grown in those counties of Ontario in which dairying is developed to a large extent, although many of the other counties are now devoting a considerable amount of attention to the fodder corns. There are scarcely any parts of Ontario in which some one or other variety of corn will not thrive unless it is in the northern districts. Even beyond the limits where it was thought that corn could not be grown, certain varieties have been cultivated and even ripened with a considerable amount of satisfaction. It is of the greatest importance, however, to secure those varieties which are particularly suitable to the localities in which they are to be grown. In order to ascertain this information, it is important for each farmer to do a certain amount of experimental work for himself. Before doing so, however, he will find very great assistance from results of experiments which we have conducted at the College with a large number of varieties, where not only the total yield per acre but also the yield of ears, the stage of maturity, etc., are taken into consideration. The variety experiments conducted at this station should serve as a general guide to the farmers in most parts of Ontario, indicating to them the kinds which are likely to be suitable for their respective localities. It is indeed impossible to mention any one variety of corn which is most suitable for Ontario as a whole. The requirements of the various localities are so very different that it seems necessary to give the results of a large number of varieties which can be studied by individual farmers in order that the greatest value from the experiments can be obtained. We are, therefore, presenting the average of five years' experiments of each of sixty-eight varieties of corn which are grown under uniform conditions. The varieties in the list are arranged according to the total yield of green corn per acre. For these experiments, the corn was usually planted during the last ten days of May, and it was harvested about the middle of September. Immediately after the crop was cut, the ears were husked, weighed, counted and examined. The stage of maturity of the corn was indicated by the condition of the grain at the time it was harvested. The seven terms which were used to describe the ripening of the corn at the time of husking were as follows: water, early milk, milk, late milk, dough, firm dough, and ripe. In each of the five years, experiments were conducted in duplicate, and we, therefore, have ten distinct experiments conducted with all of these varieties within the five year period. The average results of the five years' experiments are given in the accompanying table:

Varieties.	Description of Varieties.		Average results of Five Years Experiments, 1905-09.					
	Class of Corn and Color of Grain.	Average number of Rows per Ear. 5 years.	Condition of Grain when Harvested.	Number of of Days until in Full Tassel.	Height of Plants.	Weight per Ear.	Yield per Acre.	
							Husked Ears.	Total Crop Green.
					inches.	ounces.	tons.	tons.
1. Henderson's Eureka	Yellow Dent	16-18	Early Milk..	103	127	8 93	3.81	25.07
2. Pedrick Perfected Golden Beauty	Yellow Dent	12-14	Early Milk.	104	126	6.31	2.72	25.01
3. New Century Wonder	Flour	12	Water	110	117	2.98	1.04	23 48
4. 100 Day Bristol	Yellow Dent	14	Milk	101	122	7.64	3.68	23.10
5. Landreth's Large White Flint	White Flint	12	Early Milk.	103	124	6.17	3.04	22.36
6 Pride of Indiana	White Dent.	16-18	Early Milk	104	124	6.85	3.02	21.70
7. Darke County Mammoth	Yellow Dent	18	Milk	97	121	9.80	4.56	21 70
8. Lenocner's Homestead	Colored Dent	16	Milk	95	115	9.14	4 21	20.73
9. Mastadon Dent	Yellow Dent.	18	Milk	98	119	9.07	4.07	20.72
10. Marblehead Mammoth	Sweet	12-14	Milk	95	93	8.06	4.16	20.51
11. Salzer's North Dakota	White Flint.	8	Firm Dough.	90	100	6.95	4.22	20.22
12. Cloud's Early Yellow	Yellow Dent.	18-20	Milk	100	119	8.83	3.71	20.10
13. Early Butler	Yellow Dent.	14-16	Milk	93	117	8.46	4.31	19.85
14. Rennie's Early Giant White Dent	White Dent.	14-16	Milk	97	110	7.90	3.82	19.76
15. Reid's Yellow Dent	Yellow Dent.	16-18	Late Milk ..	97	116	8.40	3 86	19.56
16. Hoopengardner's Very Early Yellow Dent	Yellow Dent.	16	Late Milk ..	90	109	10.62	5.18	19.53
17. Top Noteh	Sweet	12-14	Milk	96	94	6.90	3.83	19.47
18 Smith's White Cap Yellow Dent (Duke)	Yellow Dent.	16	Dough	89	112	9.82	4.71	19.35
19. Triple Income	Yellow Dent.	14-18	Milk	94	112	8.86	4.26	19.28
20. Improved Leaming	Yellow Dent.	16-18	Milk	96	115	8.70	3.92	19.18
21. King Phillip (Duke)	Colored Flint	8	Firm Dough.	87	103	7.81	3.99	19 10
22. Mammoth Cuban	Yellow Dent.	16-18	Late Milk ..	93	114	8 32	3.97	18.88
23. Mammoth Southern Sweet	White Dent.	14	Milk	100	115	7.17	3.10	18.84
24 Rennie's Improved Leaming	Yellow Dent.	16-18	Milk	99	115	8.06	3.35	18.82
25. Wisconsin's Earliest White Dent	White Dent.	14-16	Milk	98	109	8.06	3.59	18.80
26. Compton's Early (Duke)	Yellow Flint	12	Firm Dough.	85	104	9.50	4.83	18.58
27. Late Mammoth	Sweet	12-14	Milk	100	95	7.43	3.35	18.52
28. Stowell's Evergreen	Sweet	14-16	Milk	97	94	7.07	3.36	18.46
29. Mayfield Earliest	White Dent.	14-16	Late Milk ..	91	109	9.46	4.38	18.31
30. Longfellow	Yellow Fint.	8	Firm Dough.	86	97	6.40	3 65	18.24
31. Quail Track	Colored Flint	12-14	Dough	87	108	9.51	4.50	18.04
32. Iowa Silver Mine	White Dent.	14-16	Milk	98	112	8.08	3.64	17.90
33 Compton's Early	Yellow Flint	12	Firm Dough.	86	101	8.65	4.20	17.86

34. Salzer's North Dakota (Duke)	White Flint.	8	Firm Dough.	86	95	7 88	4.09	17.67
35. Eight-rowed Yellow (Duke.)	Yellow Flint	8	Firm Dough.	83	98	7.77	4 16	17.58
36. Country Gentleman	Sweet		Milk	96	91	5 15	3.48	17 51
37. King Phillip	Colored Flint	8	Firm Dough.	84	97	6.68	3.98	17.49
38. Early White Cap Yellow Dent	Yellow Dent.	16	Late Milk...	93	111	8.10	3.67	17.40
39. Canada Yellow	Yellow Flint	8	Firm Dough.	85	96	7.20	3.76	16 88
40. Longfellow (Duke)	Yellow Flint	8	Ripe	81	97	6.82	3.80	16.86
41. Weigle's Leaming (Duke)	Yellow Dent.	14–16	Dough	86	109	9.63	4.59	16.83
42 Red Blazed Yellow Flint (Duke)	Colored Flint	8	Ripe	80	100	8.50	4.28	16.71
43. Bailey (Duke)	Yellow Dent.	14–16	Dough	87	105	8.96	4.43	16.70
44. Sterling White Dent	White Dent.	14	Dough	85	103	9.98	4.66	16.67
45 Genesee Valley	Yellow Flint	8	Ripe	82	96	7.47	3.90	16.58
46. Voorhee's Sweet	Sweet	12	Late Milk...	93	84	5.91	4.16	16.56
47. Hickox Sweet	Sweet	12–14	Milk	94	91	7.58	3.45	16.55
48. Leaming (Duke)	Yellow Dent.	16–18	Dough	90	109	9.54	4.10	16.03
49. Red Blazed	Colored Flint	8	Ripe	82	96	7.52	3.87	15.57
50. University No. 13	Yellow Dent.	16	Firm Dough.	83	101	8.68	4.45	15.25
51. White Cap Yellow Dent (Hammond)	Yellow Dent.	14	Firm Dough.	82	101	8.53	4.24	15.24
52. Wessel	Yellow Flint	8	Ripe	82	99	7.50	3.81	15.19
53. Crosby	Sweet	12	Late Milk.	85	82	5.89	3.79	14.27
54. Golden Dent (Gould)	Yellow Dent.	14	Firm Dough.	82	102	8.27	3.99	14.02
55. Howling Mob	Sweet	12–14	Dough	81	76	8.61	4.78	13.74
56. Perry's Hybrid	Sweet	12	Dough	83	79	7.91	4.18	13.54
57. Kendal's Early Giant	Sweet	12	Late Milk...	84	76	6.88	3.99	13.34
58. Mammoth White Cory	Sweet	8	Dough	78	71	5.99	3.79	12.46
59. Ford's Early	Sweet	8	Dough	78	72	5.97	3.85	12.33
60. Wisconsin Little Dent	Yellow Dent.	14	Ripe	77	93	8.23	3.95	11.66
61. Premo	Sweet	10	Dough	79	67	4.87	3.68	11.64
62. Farmer's Friend	Yellow Flint	8	Ripe	77	75	6.31	3.08	11.53
63. Ringleader	Sweet	10	Dough	75	66	6.02	3.76	10.95
64. Golden Bantam	Sweet	8	Dough	78	62	3.89	3.01	9.78
65. Earliest of All	White Dent.	12	Ripe	76	78	7.22	3.35	9.24
66. Independence	Sweet	8	Dough	77	66	3.97	2.89	8.96
67. Malakhoff	Sweet	10	Firm Dough	72	55	2.59	2.69	8.23
68. Peep O' Day	Sweet	8–10	Dough	72	54	3.43	2.48	5.85

The accompanying table certainly shows great variations in the results from different varieties of corn grown under similar conditions. In the average height, the different varieties range from 54 to 127 inches, the number of days from planting until the corn is in full tassel from 72 to 104, in average weight per ear from 2.6 to 10.6 ounces, in yield of husked ears per acre from 2.5 to 5.2 tons, and in total crop from 5.6 to 25.1 tons per acre.

It will be seen that, as a general rule, the large varieties are late and the small varieties are early in reaching maturity. This general rule, however, does not apply in the same way to all varieties, as, for instance, the Henderson's Eureka with 25 tons per acre is as early as the Pride of Indiana which yielded 21.7 tons per acre, the Salzer's North Dakota with a yield of 20.2 tons of green crop was as early as the Golden Dent with a yield of 14 tons per acre, and Smith's White Cap Yellow Dent with a yield of 19.4 tons was as early as the Independence with a yield of only nine tons per acre.

Although it will be seen from the results here presented that many of the varieties of corn named do not ripen at Guelph, yet these results furnish some excellent information in comparing various varieties. As some of the late varieties are advertised considerably over Ontario, a study of the foregoing table will enable farmers to ascertain for themselves whether these varieties are likely to meet their requirements. When examining the results of experiments conducted at Guelph with the corn crop, it should be remembered that these experiments were carried on in a locality which is eleven hundred feet above the sea level and eight hundred and fifty feet above Lake Ontario, and in latitude north 43 degrees 38 minutes, also that Guelph is about thirty-eight miles inland from the lakes. Keeping these considerations in view, a large amount of valuable information can be gleaned from the figures here presented.

In the spring of each year, the Ontario Agricultural and Experimental Union distributes throughout Ontario seed for three experiments with corn—one with fodder corns, one with varieties of corn for husking, and one with sweet corns for table use. Uusually three varieties are distributed for each of these experiments, which enables the farmers to ascertain for themselves which of the most promising varieties from the experiments conducted at Guelph will produce the most satisfactory results from their individual farms.

Varieties of Sorghum for Fodder.

Under the term sorghum, we include a variety of crops such as Sugar Cane, Broom Corn, Kaffir Corn, Millo Maize, Jerusalem Corn, etc. Some of these are used considerably for the production of syrup, others for furnishing material for the manufacture of brooms and whisks, and others for the production of food for culinary purposes. All of these classes, however, are more or less valuable for the production of fodder for farm stock. The sorghums are grown quite extensively in some of the States of the American Union. They thrive well in a comparatively dry, hot climate where the corn makes a slow growth. At the College, none of the varieties have been used for silage, and only one variety, the Early Amber Sugar Cane, has been used extensively for pasture. For the production of fodder, however, eighteen varieties were under experiment in 1909. Of this number, ten have been grown under similar conditions in the Experimental Department in each of eleven years. The seed was planted each year in sections by placing five seeds in a place and allowing 3⅓ links (26 2-5 inches) between the different plantings. When the sorghum was about five inches in height, some of the plants

were removed, thus allowing only three plants to remain in each place. The sorghum was cultivated in about the same way as corn. The following gives the height, the yield of heads, and the total yield of green crop per acre of each of the ten varieties and for the average of eleven years:

Varieties.	Height.		Yield of Heads per Acre.		Total Yield per Acre.	
	1909.	Average 11 years, 1899-09.	1909.	Average 11 years, 1899-09.	1909.	Average 11 years 1899-09.
	Ins.	Ins.	Tons.	Tons.	Tons.	Tons.
Orange Sugar Cane	70	92	.3	.4	9.6	18.6
Early Minnesota Sugar Cane	90	103	.5	.8	10.3	17.7
Early Amber Sugar Cane	87	94	1.0	.9	7.7	16.2
Kaffir Corn	55	64	.3	.5	7.0	12.5
California Golden Broom Corn	103	109	.9	1.6	6.2	11.5
Improved Evergreen Broom Corn	95	108	1.1	1.4	4.9	9.8
Early Japanese Broom Corn	101	105	1.1	1.5	6.1	9.7
Yellow Millo Maize	56	69	.5	.7	5.8	9.2
Brown Dhoura Corn	58	68	.5	.8	6.5	8.4
Jerusalem Corn	55	62	.4	.7	2.5	6.3

The reader is referred to the earlier part of this report for the results from the different varieties of sorghum in the production of seed. The Broom corns took the lead in seed production in the experiments at the College, but the Sugar Canes occupied the highest place in yield of green crop per acre. It will be seen that in the average of the eleven year period, the Orange Sugar Cane produced 18.6 tons, the Early Minnesota Sugar Cane 17.7 tons, and the Early Amber Sugar Cane 16.2 tons of green crop per acre. The Kaffir Corn, regarding which we sometimes read sensational articles in the newspapers, has given an average yield per acre of only about two-thirds that of the Orange Sugar Cane. The Jerusalem Corn, regarding which the writer received an advertising sheet about one yard in length before first securing this variety for experimental purposes, occupies the lowest place of all the sorghums in yield of green fodder per acre, the tonnage being only about one-third as great as that of the Orange Sugar Cane.

Varieties of Sunflowers for Fodder.

Seven varieties of sunflowers were grown in the Experimental department for several years in succession, and three of these varieties have now been grown for fourteen years. For the production of seed, the reader is referred to an earlier portion of this report. The three varieties which have been grown for fourteen years have given average yields in tons per acre, of heads, and of the whole crop, as follows: Black Giant, 6 and 20.4; Mammoth Russian, 5.6 and 16.5; and White Beauty, 5.7 and 16. The results of the White Beauty, however, are for twelve instead of fourteen years. The average results for the fourteen years also show the diameter of the heads and the height of the plants to be as follows: Black Giant, 7.1 inches and 101 inches; Mammoth Russian, 7.3 inches and 94 inches, and Black Beauty, 7.4 inches and 87 inches. The heads of the sunflowers have been recommended by some authorities as valuable for cutting and mixing with corn when filling the silo as the quality of the silage is improved thereby.

Varieties of Millet for Green Fodder and for Hay.

Although the millets are grown by some farmers for the production of seed, the main object in growing millet in Ontario is for the production of fodder. It is probably used more as a catch crop than as a regular crop in the ordinary rotation. It sometimes occurs that, owing to unfavorable weather conditions, farmers are unable to plant their corn until it is too late to insure satisfactory results. When this occurs, millet can frequently be sown at a much later date with excellent results. The spring of the past year has furnished an example when millets can, in many instances, be sown to excellent advantage. Although seventeen varieties of millet were grown in 1909, only nine of these varieties have been under experiment in each of the past five years. The following table gives the results for 1909 and for the average of five years in height, yield of green crop, and yield of hay per acre:

Varieties.	Height.		Per Acre.			
			Green Fodder.		Hay.	
	1909.	Average 5 years. 1905-09.	1909.	Average 5 years. 1905-09.	1909.	Average 5 years. 1905-09.
	In.	In.	Tons.	Tons.	Tons.	Tons.
Japanese Paniele	40	44	9.4	10.5	3.8	4.4
Holy Terror Gold Mine	34	33	10.0	9.4	4.2	3.8
Golden Wonder	36	36	9.9	9.5	4.2	3.8
Steel Trust	35	34	9.9	8.9	4.1	3.5
Hungarian Grass	32	33	8.0	8.4	3.7	3.2
Siberian	30	34	9.2	8.1	3.7	3.0
Common	33	33	8.3	7.7	3.5	2.9
German or Golden	30	33	8.0	7.6	3.4	2.8
Japanese Barnyard	36	39	6.1	8.1	2.4	2.7

It will be seen that a variety of the Japanese millet occupies the highest place in average yield of both green fodder and hay per acre of all the varieties under test. This variety, which has given such excellent results as a fodder millet, is known as the Japanese Paniele. Not only has it given good results at Guelph, but it has also made a high record in the co-operative experiments over Ontario for several years in succession. It grows to a good height, stands remarkably well, has a good leaf development, and is relished by farm stock. As it is a little later in maturing than some of the other varieties, it is not quite as suitable for growing in the northern sections of Ontario. In the greater part of the settled portions of the Province, however, it is proving to be a most valuable variety. There has evidently been a great misunderstanding amongst the seedsmen as to the different varieties of Japanese millet, as some of them in advertising the Japanese millet have illustrated the Japanese Paniele variety and have described the Japanese Barnyard Grass. These two varieties are entirely different. The writer has been informed that, in many instances, the farmers have written expecting to receive Japanese Paniele millet which has a dark, reddish-brown, shiny seed, and they obtained the Barnyard Grass which is much lighter in color and has not the glossy appearance of the Japanese Paniele variety. It is wise always in ordering millet from the seedsmen, not only to mention definitely the variety required, but also to ask for a sample before ordering in bulk, and thus be sure that the seed is true of the variety which it is desirable to secure.

Dates of Sowing Millet.

For four years in succession an experiment has been conducted with the object of gleaning information regarding the best time to sow millet seed for the production of green fodder and of hay. For this experiment the Japanese Panicle, the Japanese Barnyard, and the Hungarian Grass were the varieties used. The seeding took place on the second of May in 1906 and in 1907, on the 4th of May in 1908, and the 15th of May in 1909, and the succeeding seedings every half month until, in all, seven sowings were made, except in 1909, when only six seedings were used. As it is difficult to make hay out of the crop produced from the late seedings, especially in the case of the Japanese Panicle variety, the results have been worked up in the green crop. The following table gives the average yield of green crop per acre produced in 1906, 1907, 1908, and 1909 of each of the varieties from the different dates of seeding and also for the average of the three varieties:

Dates of Seeding.	Average yield of green crop per acre.			
	Japanese Panicle	Japanese Barnyard.	Hungarian Grass.	Average 3 varieties.
	Tons.	Tons.	Tons.	Tons.
May 15th	8.62	6.88	7.01	7.50
June 1st	10.28	8.74	7.50	8.84
June 16th	10.28	8.18	7.39	8.62
July 1st	8.26	7.65	7 83	7.91
July 15th	8.06	6.10	7.08	7.08
Aug. 1st	.....	.....	3.06	.....

From the results here presented it will be seen that the greatest yield of green fodder per acre was produced from the seedings of June 1st and June 16th for the Japanese Panicle variety; the seeding of June 1st for the Japanese Barnyard variety; and the seeding of July 1st for the Hungarian Grass. In the average results of the three varieties, the greatest yield per acre was obtained from sowing on the 1st of June. An examination of the results of these experiments seems to indicate that there is a possibility of sowing these varieties of millets at either too early or too late a date, even in the growing season, if the most satisfactory results are to be obtained. The results here presented also show that millet will stand comparatively late seeding and is of value as a crop to sow on land which has been prepared for corn or roots which could not be planted in the proper season owing to wet weather or some other cause.

Varieties of Rape, Kale, Cabbage, etc., as Farm Crops.

Although field rape has been grown considerably in different parts of the Province, few farmers are familiar with other varieties of rape or of similar crops for feed production. It is, therefore, interesting to make a careful study of the different kinds of rape, kale, cow cabbage, mustard, etc., in order to understand the comparative results of these crops when grown in Ontario under Ontario conditions. Some of these are grown somewhat extensively in Great Britain. No less than 29 varieties belonging to this class of crops were grown under test at the College in 1909. The crops were all sown in rows 3⅓ links (26 2-5 inches) apart. Each plot was exactly 1-100 of an acre in size consisting of three rows each four rods in length. The seed was sown at the rate of about two pounds per acre, and the

plants of each variety were thinned to two inches apart in the rows. The land between the rows was cultivated occasionally throughout the early part of the growing season. The seeding took place on June 21st, which is about a week later than the usual time of seeding. When the crops had reached their best condition for feeding in the autumn, each variety was cut with a scythe and weighed in the green condition.

This class of crop is usually fed to sheep or hogs or young cattle. In England the cabbage seed is frequently sown in the garden or in hot beds and the young plants are transplanted in the field at sufficient distances apart to produce large heads. This, however, requires a great amount of labor, which is an important item in connection with agriculture in Ontario at the present time. In this experiment the different varieties of cabbage have been treated in exactly the same way as the different varieties of rape and kale. The heads of the cabbage, therefore, have been quite small, the growth being principally leaf and stem. The quality of these crops, however, appears to be very good. The following table gives the results of this experiment for 1909 and also for the average of five years.

It will be seen that the Dwarf Essex Rape, which is the best known variety of this class in Ontario, has been surpassed in average yield of green crop per acre by fully six tons per annum. Of the five highest yielding varieties, four of them are cabbage. The Sutton's Earliest Drumhead Cabbage gave the highest yield of crop per acre in 1909, and also in the average results for five years.

Varieties.	Height.		Green Fodder, per acre.	
	1909.	Average 5 years 1905-09.	1909.	Average 5 years 1905-09.
	Ins.	Ins.	Tons.	Tons.
Sutton's Earliest Drumhead Cabbage	18	19	23.7	27.7
Sutton's Giant Drumhead Cabbage	19	21	21.2	26.0
Thousand Headed Kale	26	36	16.2	26.0
Sutton's Earliest Sheepfold Cabbage	17	18	19.7	24.6
Sutton's Best of All Savoy Cabbage	16	18	19.1	22.5
Large Seeded Umbrella Rape	21	28	11.3	22.1
Large Seeded Common Rape	23	30	12.7	22.1
Marrow Collards	20	24	17.7	21.9
Dwarf Victoria Rape	21	29	14.5	21.9
Dwarf Essex Rape	22	30	14.1	21.4
Buckbee's Wonderful Dwarf Bonanza Rape	24	29	16.3	20.9
Purple Sprouting Broccoli	25	32	14.5	20.8
Hardy Curled Kale	21	28	13.6	20.5
Large Seeded White Flowering Rape	23	30	14.2	20.5
Jersey Kale	24	32	14.1	20.4
Cabbage Leafed Rape	24	32	12.4	20.1
Brussel's Sprouts	21	25	11.2	16.4
New Chinese Mustard	65	62	11.2	15.3
Southern Giant Curled Mustard	58	54	10 6	15.2
Bloomsdale Large Leafed Mustard	62	60	11.3	14 9
White Mustard	61	57	12.1	13.7
Creole Mustard	60	54	11.9	12.9
Brown Mustard	63	63	7.6	11.3
German Rape	7	18	3.8	5.2

Besides the varieties enumerated in the table, five other varieties have been under experiment for less than five years. Of these, the one known as the World

Beater cabbage has given the greatest yield in the average of two years, being 26.6 tons. This was followed by the Simmer's Matchless Flat Dutch cabbage, with an average for the two years of 25.4 tons per acre, and this, by the Simmer's Early Brunswick cabbage, with an average of 23.5 tons per acre for the two years.

Leguminous Crops for Green Fodder.

In 1909, twenty different varieties of Soy beans, Cow peas, vetches and grass peas were grown for the production of fodder. As most of the varieties in each of these classes require a longer season for growth than that furnished in Ontario, many of them do not prove successful. The greatest yields in tons per acre in 1909 were produced by the following varieties: Harbara Soy beans, 9.2 tons; Grass peas, 8.0 tons; Amherst Soy beans, 7.6 tons; Shingto Soy beans, 7.5 tons; Cloud Soy beans, 7.4 tons; Hairy Vetches, 6.8 tons; Tsurunoko Soy beans, 6.5 tons; Chernie Soy beans, 6.1; and Nuttall Soy beans, 6.1 tons.

Six varieties of leguminous crops have now been grown for five years in succession for the production of green fodder. The greatest yields have been obtained from the Grass peas, 6.9 tons; Ito San Soy beans, 6.8 tons; Early Yellow Soy beans, 5.5 tons; and Wonderful Cow peas, 5.2 tons per acre.

Alfalfa or Lucerne.

A bulletin on Alfalfa or Lucerne was issued in the spring of 1908. The bulletin referred to results of experiments conducted at the Ontario Agricultural College and referred to the reports of co-operative experiments in Alfalfa growing throughout Ontario. Copies of this bulletin can be obtained by writing to the Department of Agriculture, Toronto.

The following table gives the yields per acre of the different cuttings for both green fodder and cured hay of the alfalfa as produced in the Experimental Department at the College in each of 12 years:

Years.	Green Crop.					Hay.				
	First Cutting.	Second Cutting.	Third Cutting.	Fourth Cutting.	Total.	First Cutting.	Second Cutting.	Third Cutting.	Fourth Cutting.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons
1896....	9.96	6.47	4.06	2.06	22.55	3.08	1.91	1.29	.65	6.93
1897....	12.04	5.61	4.43	.....	22.08	3.59	1.56	1.23	.....	6 38
1898....	9.71	5.85	2.64	.....	18.20	2.30	1.75	.63	... ...	4.68
1900....	11.93	6.00	1.60	.....	19.53	2.33	1.47	.80	.....	4.60
1901....	9.70	2.20	7.49	.....	19.39	2.03	1.00	1.50	.....	4 53
1902....	13.35	8 69	2.96	.....	25.00	2.50	2.02	.54	.....	5.06
1903....	13.10	8.53	2.75	.....	24.38	2.50	2.09	.67	.....	5.25
1904....	12.45	9.35	4.00	.....	25.80	3.40	2.50	1.08	.....	6.98
1906....	9.78	6.60	4.85	.....	21.23	2.55	1.13	.58	.....	4.26
1907....	14.55	3.95	.....	.....	18.50	2.95	1.05	.....	.....	4.00
1908....	9.70	6 75	3.73	....	20.18	2.50	1.15	.75	.....	4.40
1909....	8.68	4 56	.84	.....	14.08	2.52	1.40	.14	.....	4.06
Average 12 years	11.25	6.21	3.28	.17	20.91	2.69	1.59	.77	.05	5.10

The figures here presented are the results of experiments which took place in different parts of the experimental grounds, mostly in comparative tests, with different varieties of clover. In every case the crop was sown in the spring of the year at the rate of 18 or 20 pounds of Alfalfa seed per acre and usually with a grain crop, such as, barley sown at the rate of one bushel per acre.

In each of ten years the alfalfa gave exactly three cuttings, but in 1907 it produced only two, while in 1896 it gave four cuttings in the one season. It

will be remembered, however, that the spring of 1896 opened up very early and that of 1907 exceptionally late.

The average results for the twelve years show the annual yield of alfalfa to be 20.9 tons of green crop and 5.1 tons of hay per acre.

Different forms and strains of alfalfa are known principally by the country in which they have been grown for a number of years. Though this is very indefinite, there appears to be different strains of alfalfa produced in Turkestan, the value of which varies considerably. Much has been claimed in the United States and in Canada for the Turkestan alfalfa. The results of the experiments which have been conducted at Guelph within the past twelve years show that the so-called Turkestan alfalfa obtained through the seed trade of the United States and Canada has displayed no perceptible advantages over the common variety obtainable in this Province. Wishing to obtain fuller information regarding the best sources of purchasing alfalfa seed of the best quality for use in Ontario, we secured for experimental purposes samples of seed grown in different parts of the world. Some of these were obtained through the kindness and co-operation of the Department of Agriculture at Washington, and some were obtained direct by the College. In the spring of 1905, 28 plots were sown with the alfalfa seed obtained from different sources. From each of the plots three cuttings for hay were made in 1906; one cutting for hay and one for seed in 1907; three cuttings for hay in 1908; and three cuttings for hay in 1909. The following table gives the average dates of the first appearance of bloom and the average yield per acre of the green crop and of hay for the three years, 1906, 1908, and 1909:

Source of Seed.	Dates of First Bloom. Average 3 years.	Total yield per acre. The cuttings in each of the years 1906, 1908, 1909.	
		Green Crop.	Hay.
	June.	Tons.	Tons.
Texas, Panhandle	17	18.7	4.9
Nebraska	15	17.6	4 5
Turkestan, Khiva	18	16.7	4.2
Nebraska	21	16.1	4.1
Turkestan Samarkand	19	16.2	4.1
New York	14	16.6	4.0
Chinese Empire, Sairam	19	15.6	4.0
Russia, Simbirsk	16	16.2	3.9
Northern Montana	15	15.4	3.8
Utah, irrigated	18	14.4	3.8
Northern Montana	17	13.7	3.6
Southern Montana	18	13.6	3 6
Texas, Sherman	15	14.0	3.4
France, Poitou	15	14.8	3.4
Ontario, O.A.C. seed, 1904	17	14.0	3.3
Germany	13	13.3	3.2
Colorado	19	13.0	3.2
Kansas	21	11.2	3.0
Ontario, O.A.C. seed, 1903	18	11.9	3.0
Utah	16	11.2	2.9
United States, first quality commercial seed	14	11.9	2.8
Russia, Kharkoff	14	11.6	2.7
Turkestan, through Wm. Rennie, seedsman, Toronto	20	10.8	2.7
Italy	15	11.2	2.5
Turkestan, through Currie Bros., seedsmen, Milwaukee	15	10 3	2.4
France, Provence	18	9.5	2.2
Arabia	18	2.4	.6
Peru	....	.0	.0

A casual glance at the table shows that the results obtained from the seed of the Turkestan Alfalfa, which was obtained in America, were decidedly lower than those obtained from the Turkestan Alfalfa obtained from Turkestan.

Sowing Alfalfa.

Alfalfa should be very carefully tested on many farms throughout Ontario. Its large yields of nutritious feed for farm stock, its perennial character of growth, and its beneficial influence on the soil, are all features which commend it very highly for those farms on which it can be grown successfully.

There are different ways of laying down a plot or a field to Alfalfa, and we would suggest the following method as one which is likely to give very excellent results: Select land having a clean, mellow, fertile surface soil overlying a deeply drained subsoil having no acidity. Use large, plump seed, free from impurities and strong in germinating power. Inoculate the seed with the proper kind of bacteria, providing Alfalfa has not been grown successfully on the land in recent years. As early in the spring as the land is dry enough and warm enough to be worked to good advantage, make a suitable seed-bed and immediately sow about twenty pounds of Alfalfa seed per acre from the grass seed box placed in front of the grain drill, and about one bushel of spring wheat or of barley per acre from the tubes of the drill. Smooth the land with a light harrow or with a weeder, and if it is very loose and rather dry, also roll it and again go over it with the harrow or the weeder. As soon as ripe, cut the grain and avoid leaving it on the land longer than necessary. Give the alfalfa plants every opportunity to get a good start in the autumn in preparation for the winter. If for hay, cut each crop of alfalfa in the folowing year as soon as it starts to bloom. In curing, try to retain as many of the leaves on the stems as possible, and to protect the crop from rain. Never cut or pasture alfalfa sufficiently close to the ground to remove the crowns of the roots, and thus injure or possibly kill the plants. If these directions are followed, the alfalfa may be expected to produce large and valuable crops for a number of years without re-seeding.

Annual Pasture Crops.

In experiments extending over several years, we have found that the following mixture has given very good results indeed for sowing in the spring of the year for furnishing pasture for cattle in the same season in which the seed was sown:

Oats (1½ bushels)	51 lbs. per acre.
Early Amber Sugar Cane	30 lbs. per acre.
Common Red Clover Seed	7 lbs. per acre.
Total	88 lbs. per acre.

This mixture in each of the past four years has furnished pasture which has been greatly relished by animals and has furnished a sufficient amount of pasture material to more than supply one animal per acre.

We have on each occasion obtained a good catch of red clover which formed an excellent matting on the ground in the autumn and was ready to come through the winter and furnish a crop of clover in the following season. There was probably no experiment at the College in which the thousands of excursionists who went over the experimental grounds the past summer took a greater interest.

We trust that the results of the various experiments here presented may prove of real value in the improvement of the agriculture of our Province.

Respectfully submitted,

C. A. ZAVITZ.

PART XVI.

THE LECTURER IN ECONOMICS.

To the President of the Ontario Agricultural College:

SIR,—I have the honour to submit herewith the report of the department of Economics for 1909.

The courses of lectures as outlined in the College Calendar, have been delivered to Second and Third Year students. It is very gratifying to me to be able to report also that one lecture period per week with Fourth Year has been arranged for, to run throughout the Fall and Winter Terms. This affords an opportunity to devote special attention to certain subjects, hitherto receiving treatment only in a casual way. Although it is felt that in such a subject as Economics much more time might be advantageously spent with students about to undertake work of a public nature, yet I feel grateful for the recognition the work of this department has received, and hopefully look forward to at least two periods per week with the Senior Class. I need hardly state that the wider the student's experience the greater is his interest in the public and social questions of the day; hence the progress achieved by a student is greatly accelerated as he approaches his final term at College. In view of this I would most earnestly request your consideration of an additional period with this class.

As mentioned in my last report, the Junior Class are required to make simple economic investigations into various subjects in different parts of Canada and the United States. This year most of the researches have been made in connection with Agricultural Co-operation and organization and has proved a most attractive field. Up to the present the reports have not been completed, but evidence is not lacking of excellent work being done by the majority of the class. A glance at the following list of subjects will give some idea of the nature of the questions chosen by members of the Junior and Senior Classes for investigation:

A study of how commodities are marketed as the present time—Manufactured Goods as compared with Agricultural Products.

Education and Co-operation—Is co-operation the result of education, or is education the result of co-operation?

Forms of organization of co-operative societies—Joint stock, no share company, etc.

Difficulties of organization.

Co-operative Credit Associations.

Possibilities of Co-operative Production and Distribution.

The Status of Agricultural Co-operation in other countries, e.g., Denmark, France, Ireland, Germany, Scotland.

Agricultural Co-operation in Canada as compared with above countries.

Canada's agricultural resources as compared with those of above countries.

Problems peculiar to the marketing of special products such as grain, hogs, eggs, butter and cheese, fruit, etc.

How to form a Co-operative Society.

How to incorporate a Society; and advantages of incorporation.

These are a few of the subjects receiving consideration during the present year.

English.

The work which has been assigned to me in this department is English Composition with Second and Third Years, and Public Speaking with Second Year.

The practice in regard to Composition is to assign a theme each week, upon which an essay is written and handed in for examination. Marks are assigned, errors pointed out and suggestions offered each week and the papers handed back at the close of the lecture period. The essays are, for the most part, written out of class, but occasionally an impromptu paragraph is called for in the regular lecture period. In this way students are induced to think rapidly and logically, and to say what they mean in the neatest and most effective manner. The work of examining these products, however, is closely akin to slavery, especially when the number goes on increasing as is inevitable with the progress of the institution. This year my attempt has been to read and examine, in the two classes, one hundred and fifty essays per week.

Public Speaking. Public speaking is taken with Second Year during the Winter Term. Here again the largeness of the class reduces individual attention to the minimum, but the aim has been to afford the student an opportunity to become used to the platform; cool and collected before an audience; and capable of translating his ideas into intelligible and acceptable English. No attempt is made to endow a student with the "gift of the gab," and very little is done with gesticulation and oratory in the commonly understood sense of the terms. A student, however, after taking the course, should be capable of appearing before any audience and doing justice to his knowledge of the subject under consideration.

In all, four afternoon periods per week are devoted to this subject.

Respectfully submitted,

H. H. LeDREW.

PART XVII.

THE DIRECTOR OF HOME ECONOMICS.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith the sixth annual report of the work of the Home Economics Department, for the year 1909.

The Year's Work.

The Home Economics department has been almost wholly occupied with the instruction of students. Eighty-three per cent. of the students were in the non-professional classes, and we may hope they will put to practical use in their own homes the knowledge gained. There have been few changes in the courses, but the staff has suffered several changes. The outstanding feature of the year is the number of applications which had to be refused for want of residence accommodation. This works well in connection with professional courses, since it permits the selection of the best material, but against the interests of the rural student to whom the residence life is of special value.

The Different Courses.

The Normal Course in Domestic Science.

Thirteen entered the two-year course in September, 1907. Twelve passed into the senior class in September, 1908; nine passed the final examinations, and have received the Macdonald Institute Teachers' Certificate in Domestic Science. Twenty entered the course in 1908, nineteen passed on to the senior class in September, and two obliged to drop out of last year's class rejoined this year's class, making twenty-one now in attendance. There were many applications for entrance this year, but the class was limited to sixteen who entered last September.

Five experienced teachers entered the one-year course in September, 1908; all passed the final examinations in June, 1909, and have received the Macdonald Institute Teachers' Certificate in Domestic Science. The large number coming forward from the junior class taxed our resources and we were able to accept but four of the many applicants for entrance in September. The limitation of the present junior class will remedy this difficulty next year.

Hitherto applications for admission to the two-year course have been accepted as they came until the class filled. In future, the rule applied to one-year applications of accepting none until June, will apply to both classes. The large number offered will enable us to choose the strongest teacher-material, and reject the weak, and should greatly improve the quality of our teacher-graduates.

The Guelph Public and High Schools sent us four classes throughout the year, for practice-teaching.

2. *The Housekeeper Course.*

Three entered the course in September, 1907, and two more in January, 1908; all passed to the senior class in September, 1908, and two more entered by virtue of Homemaker work; six passed the final examinations of June, 1909, and have received the Macdonald Institute Housekeeper Certificate. Eight entered the course in September, 1908, six passed on to the senior class, September, 1909, and are now in attendance. Ten entered the junior class last September.

As this course becomes better known we shall have the usual difficulty of more applicants than accommodation. The mature woman whose household experience has been good, whose health is sound and who is still mentally alert, is the right kind of material for this work, and the demand for trained women is greater than the supply. All but one of last year's graduates are settled at work with salaries ranging from $35 to $50 per month in addition to living. As living usually means attractive and comfortable quarters, and the social position is good, it will be seen that our housekeeper graduates have prospects which compare favorably with those of our teacher graduates.

Housekeeper graduates who have completed six months' satisfactory housekeeping in an institution are entitled to the Macdonald Institute Professional Housekeeper Certificate. It was issued for the first time this year, when seven graduates of various years received this recognition of their professional standing.

3. *The Homemaker Course.*

Thirty-seven entered this class in September, 1907; twenty-two passed the final examinations last June and have received the Macdonald Institute Homemaker diploma. Thirty were admitted to the course last September and are now in attendance.

There was a time when the interest of this class in the actual cooking and sewing classes was much greater than in the science or reasons at the bottom of the practical operations. We are glad to note the gradual deepening of interest in all the household questions, and we look forward to the day when the Homemaker class will demand two years' work and as many if not more science classes than the teachers' class.

It is encouraging to note that nearly sixty per cent. of the last class completed the course, a decided advance on the previous year when but forty-four per cent. went through.

4. *The Short Course in Domestic Science.*

The flexibility of this course is very satisfactory. It gives a fixed course in cookery, laundry, house-practice, foods, sanitation and home nursing, but permits variation in the sewing and electives, according to the students' ability and interests. There were in attendance this year in the Winter Term, January to March, 48; Spring Term, April to June, 38; Autumn Term, September to December, 30; making a total of 116.

5. *The Short Course in Sewing.*

The interest in this course is growing rapidly. It appeals to the girl who wishes to learn to do the simpler dress-making of the average family. Hitherto she has been obliged to serve her time in a regular dressmaker's shop, where she must spend long days and do a great deal of unnecessary work; and where she picks up what she can about cutting and fitting, and receives little specific teaching on the subject. The dressmaker cannot be blamed since her business is to produce dresses. Our course centres round the girl and cultivates her ability to choose and plan and cut and fit her material with due regard to suitability and color harmony. In consequence of this concentration of the student's attention, the average girl learns more in three months than the shop apprentice learns in twice the time. In addition she has the protection of life in residence, and the valuable training of living with many other girls.

There were eight in attendance during the Spring Term, April to June; in the Autumn Term, eleven, September to December. These classes must be kept small owing to the constant need of individual supervision as they demand a great deal of the chief sewing instructor's time. During the Winter Term the pressure of other classes is too great to permit of a sewing course.

The two classes of the year made very attractive exhibits of their work, which were surprising to many who had not followed the progress of the various gowns, hats, embroidery and color-work pieces.

6. *The Summer Course in Domestic Science.*

With the hope of making this course more popular, the work was limited to cookery, laundry and home nursing. This made it possible to give a really good series of lessons in each, and did away with the unpopular sewing of the previous years. Eleven, the same number as last year, entered the course and were enthusiastic students.

Optional Courses.

These students are not taken into residence, and no special classes are formed for them, which limits the attendance to townspeople who find room in different

classes after the regular students are settled. The Winter Term had 5, the Spring Term 5, and the Autumn Term 3, chiefly in the sewing classes.

Student Workers.

Nine girls have this year been able to pay for a Short Course in Domestic Science by giving us four months' service in Macdonald Hall. A tenth is doing a full year of stock-room work, preparatory to a year of Housekeeper training.

Special Lectures, Meetings, Etc.

The special marketing lectures were carried out by College professors as follows: Fruits, Prof. Hutt; Vegetables, Mr. Crow; Canned Food, Prof. Edwards; Cereals, Prof. Harcourt, and Meat Cuts, Prof. Day.

This department was represented at the Ontario Educational Association last April by myself.

A party of Senior Housekeepers spent two days in Toronto last spring, studying the methods and equipment of certain large laundry and restaurant plants. They considered the time well spent if only for the lesson of economy through efficient management and well-placed machinery.

We have no fresh research work to report, owing to the time of the staff being fully occupied with the work of class-instruction.

Women's Institute Work.

This department has always taken a great interest in the Women's Institute, and has frequently invited the members to send to us for help along our line of work. Recently we realized that members living far from towns had few resources in the way of books and magazines dealing directly with home interests and household affairs, and that many members would be glad to borrow material from us to help them in the preparation of papers for the monthly meetings. We decided to make an effort to place the resources of our books, magazines and pamphlets at their service. Accordingly, a general intimation of our willingness to lend our material was made to the Women's Institute Convention of 1908, and Mr. Putnam distributed last winter, through his Women's Institute lecturers, the following special circular:

ONTARIO DEPARTMENT OF AGRICULTURE.

Women's Institute Branch.

We are pleased to be able to announce to Institute officers and members that *Macdonald Institute, O.A.C., Guelph, Ont.*, is prepared to render assistance to those who wish information to enable them to prepare papers or addresses for presentation at meetings of the Institute.

By reason of the special training of the Macdonald Institute staff, and the resources of various departments of the College, the Home Economics Department is able to answer many questions and solve many difficulties now perplexing the housekeepers of this country, and will be pleased to try to answer such questions as the members of the Women's Institute care to send in.

A good reference library of books on Home Economics subjects is being gathered, and a collection of pamphlets and magazine articles is being made. These books, pamphlets and articles Macdonald Institute is willing to lend to Women's Institute members.

In order to prevent disappointment and delay, the borrower should observe the following directions:

1. Address your request to Home Economics Department, Macdonald Institute, O.A.C., Guelph, Ont.

2. State the subject of the paper or speech you have undertaken to provide, and the date for which it is wanted.

3. As it is seldom possible to answer questions or requests by return mail, and some require several days to satisfy, please send them in at least a fortnight before the answer is wanted.

4. When returning papers or pamphlets, please do not roll or fold them, but return them in flat package as received.

For information as to Methods of Organization, Rules and Regulations governing the Institutes, Suggestions as to ways and means of making the Institute meetings most interesting and profitable, financing the organization, etc., apply to

GEO. A. PUTNAM,
Supt. of Women's Institutes,
Parliament Buildings,
Toronto, Ont.

May, 1909.

Our books are catalogued and easy to send out, but book post is expensive, especially when one chapter of a heavy book frequently satisfies a question, or when one book does not cover the ground. We therefore turned to our rapidly growing collection of unbound literature and began to put it in shape for mailing. This necessitated tearing up the magazines to separate the articles worth preserving, the putting of each article or pamphlet into a numbered folder, and the reading of each in order to make an intelligible reference for the card catalogue. No special person was available, the work had to be done in odd hours, and progress has not been very rapid, but we have now about 1,500 filed away and another 1,000 well under way. They are classified as follows:

Home.
House. Plans, furnishings, decoration, sanitation, care and cleaning.
Food. Composition, general information, preparation.
Dietetics. General information, dietary standards, diet for different ages.
Health.
Social.
Education.
Economics of the Home.
Dress and Textiles.
Arts and Crafts.
Miscellaneous.

We have set up a simple circulating system, and find it an easy matter to find, send out and keep track of our catalogued material.

We had this year about 360 requests for material, on all sorts of subjects from recipes to ethics, from housecleaning to home nursing, and were able to send articles, pamphlets or books to 250 women. Of the remainder about a third came in the summer when there was no one who could attend to the work, 25 per cent. wanted material already out on loan, and the rest gave subjects not covered by our collection.

Many times the other departments have helped greatly by answering questions much more satisfactorily than we could. A notable instance of this was Dr. Bethune's samples of the insect which develops into the buffalo moth, and his careful directions for preventive measures, which went to one Women's Institute desirous of studying that subject.

Cataloguing is laborious, but this has been well worth doing if only as the basis of a collection valuable for our own students. The members of the Women's Institute have proved appreciative, and we believe the effort has been justified.

We wish, however, to extend the same welcome to questions from any woman who reads the above and thinks we can help her with any household problem.

Staff Changes.

Miss Givin was finally obliged to give up teaching on account of ill health and resigned last March. Her place has been filled by Miss Jean Roddick, of Cobourg, a graduate of the Ontario Normal School of Domestic Science and Art, who has been on the staff of the Toronto Public School domestic science teachers.

Miss Ferguson leaves our staff at the end of this year to take up the domestic science work of the Berlin Manual Training High School, for the sake of the more varied and wider experience it affords. Her place will be filled by Miss Mary McLennan, a 1907 graduate of our own, who comes to us from dietitian work in the University of Pennsylvania Hospital, Philadelphia.

Miss Nealina Macmillan, supervisor of house-practice, leaves our staff at the end of this year, to take a housekeeper position in Macdonald College, Quebec. Her place will be filled by Miss Eliza Maddock, a 1909 graduate of our Housekeeper Course.

Macdonald Institute owes much to these teachers. Miss Givin was one of the members of the original staff and a large measure of the success of our teacher graduates is due to her efficient teaching; Miss Ferguson has done most effective Short Course work in her three years of service; and Miss Macmillan has so satisfactorily developed the house-practice that she has won the students' full respect for the value of the work.

Equipment, Etc.

Parents look upon the residence life as a valuable part of the education given here, and besides very few are willing to let their daughters live alone in down town boarding houses. On opening day last September we had fifty girls on our waiting list who would have come had they been able to board in. Every room in Macdonald Hall for next term has been taken since September 20th, we have twenty-four waiting for possible vacancies, and a considerable list of those who have declined to go on the waiting list. Very little additional expense will enable Macdonald Institute to handle additional classes, but it is useless to provide for them until the Hall can accommodate them. We may of course plan for the unification and improvement of our present courses, but it is idle to look for further expansion of our work until the residence difficulty is overcome.

I beg to acknowledge the efficient work of the other members of the Home Economics staff, and the valuable help given this department by many of the other departments.

Respectfully submitted,

M. U. WATSON.

PART XVIII.

THE PROFESSOR OF MECHANICS AND MANUAL TRAINING.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the sixth annual report of the department of Farm Mechanics and Manual Training for 1909.

In addition to the regular work of this department, an additional course was instituted in Elementary Industrial Arts. This course was arranged by the Department of Education for the instruction of a selected number of teachers-in-training at the Normal Schools who had successfully passed the April examinations for Second Class Certificates and had fulfilled the other conditions prescribed by the Department of Education. The object of the course was to prepare a body of teachers for organizing and carrying out that Department's scheme of Elementary Industrial training in the urban schools of the Province, in centres which are unable to provide adequately equipped Manual Training departments. A brief outline of the course will be found in subsequent pages of this report.

To carry out the instruction projected in the Department of Education's circular, 13th February, 1909, entailed more work than could be undertaken by the permanent staff of this department, and temporary assistance had to be procured. We were fortunate in securing the services of Mrs. Walter Misener, Wellandport, and Mr. John A. Stiles, B.Sc., of the School of Practical Science, Toronto. In arranging instruction in Farm Mechanics for Second Year students during the Fall Term, we were again fortunate in securing the valuable services of Mr. R. W. Wade, B.S.A., Lecturer in Animal Husbandry. The large increase in the number of the Second Year students makes it difficult to arrange a rota of instruction in the three subjects of Farm Mechanics, Forging and Machine shop practice. We are obliged to divide each division of the year into three sections, each section containing a larger number than can be accommodated in either forge room or machine shop, the surplus being drafted into Machinery Hall. This makes the class very unwieldy, and too large for one man to handle, and renders the instruction very unsatisfactory, as the majority of students get only two lessons in forging and in vice work, a large percentage of them receiving only one lesson in each of the last named subjects. It is therefore very desirable that adequate provision be made in the Forge room and in the Machine shop to meet the increased demand upon the resources of this department. Basing our calculations upon the number of students at present in attendance, it would be necessary to instal in the Forge room five additional forges, and five more vises in the Machine room.

WINTER TERM. There were in attendance 129 First Year students receiving instruction in Woodworking and Mechanical Drawing. Thirty-nine lady students attend lectures in Color and Household Decoration, and ten took the course in Simple Carpentry.

The Spring Term opened with 45 students attending the course in Color Work and Household Decoration, together with 40 Normal School graduate teachers for Elementary Industrial Arts.

The course of study for the Normal students was as follows:

Pedagogics, Etc.

(15 hours.)

(*a*) Manual Training as a factor in general education; (*b*) Sketch of the various systems, Russian, Swedish, Sloyd, etc.; (*c*) Progress of Manual Training in Canada; (*d*) Methods of teaching, plans of courses and lessons; organization, equipment, plans, estimates of cost, etc.; (*e*) Lectures dealing with industrial questions and the means of improving our opportunities; (*f*) Visits to local industries and consideration of industrial development of Canada.

Drawing, Applied Art and Design.

(120 hours.)

Emphasis was given the practical application of drawing to the industries.

Drawing: (*a*) The use of squares, triangles, and instruments; (*b*) Plane geometry, practical problems, lines, angles and polygons; (*c*) Construction and use of plain scales; (*d*) Orthographic projections of solids—three or more views; (*e*) Cutting and oblique planes and sections; (*f*) Isometric projection; (*g*) Working drawing; (*h*) Machine drawing; (*i*) Tracing—blue printing.

Applied Art and Design: Observation of these in local manufactures and in common decorated objects such as wallpaper, carpets, furniture, cloths, jewellery, iron and brasswork; practical applications in everything undertaken in the constructive work.

Woodworking.

(100 hours.)

(*a*) Bench exercises in making articles requiring joints, mortises, fastenings with dowels, pins, cleats, keys, wedges, glue, screws and nails, etc.; (*b*) Calculation of the quantity of lumber necessary for making the articles and estimation of cost; (*c*) Tools (5 lessons), their construction, care, use and sharpening; (*d*) Analysis of the action of cutting tools, cutting angles, etc.

Finishing (2 lessons): (*a*) Staining, fuming, filling, shellacing; (*b*) Oil and wax polishing; (*c*) Pigments, priming, coats; (*d*) Oils, driers, brushes; (*e*) Painting and glazing.

Forestry and Lumber (4 lessons): (*a*) Forest Preservation—propagation, time of cutting, pruning; (*b*) Trees—classes, structure, growth, seasoning, shrinking and warping; (*c*) Properties of woods—durability, elasticity, stiffness, density; (*d*) Varieties of common woods—peculiarities of each, color, grain, identification; (*e*) Defects in lumber—resin, pockets, knots, shakes; (*f*) Decay and its causes—preservation; (*g*) Lumbering—Transportation, sawmills, grading widths.

Constructive Work.

(65 hours.)

(*a*) Cardboard work—thin and thick boards (20 hours); (*b*) Modelling—clay, sand and papier mache (10 hours); (*c*) Simple bookbinding (10 hours); (*d*) Simple metal work (15 hours); (*e*) Knife work such as can be carried on in the ordinary class room at the school desk (10 hours).

Time Table.

Showing allotment of time for each subject:

——	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
9 to 10.30.....	Drawing.	Drawing.	Drawing.	Drawing.	Drawing.
10.30 to 12.....	Constructive Work.	Constructive Work.	Constructive Work.	Drawing.	Pedagogics, Methods, Planning, Lessons, etc.
1.30 to 4.30.....	Woodwork.	Woodwork	Woodwork.	Visits to local industries.	Woodwork.

The Department of Education granted a certificate in Elementary Industrial Arts to those students who completed the course satisfactorily and gave evidence of ability to carry on this work successfully in the schools. The daily record of this class work under the observation of the instructors, as well as the results obtained at the final examinations, were taken into consideration in awarding the certificate. The successful candidates were also granted the Three Months' Course Certificate issued by the College. The work covered in this term is accepted *pro tanto* towards securing a Specialist's Certificate in Manual Training.

The work was supplemented by visits to local and outside industries, so that the students might become acquainted, as far as possible, with the various processes, organizations and conditions governing industrial pursuits. The class visited the Raymond Sewing and Cream Separator Factories, Tolton's Agricultural Implement Works, the Bell Piano and Organ Factory, the Taylor-Forbes Factory, and the Paper Box Factory, all of Guelph; the Woollen Mills, Hespeler, and the factories of Galt. At all of these places we were courteously received, and arrangements were made by the firms to take the students through the factory in small groups, thus giving every opportunity to thoroughly examine the product and machinery of the plant, which proved both interesting and instructive. We extend to the managements of these industries our hearty thanks for every consideration and kindness shown us.

While this class was in session it was visited by the following officials of the Department of Education: Inspectors R. H. Cowley, A. H. Leake and Dr. Merchant; also Principal Scott, of the Normal School, Toronto. Appended is a list of those who received certificates:

Normal School.	Name.	Post Office.	County.
London	Abbott, Lina E.	Lucan	Middlesex.
Ottawa	Casselman, Geo. K.	Williamsburg	Dundas.
Stratford	Cluff, Mollie E	Clinton	Huron.
London	Copp, Edna	Clinton	Huron.
Ottawa	Curtin, Agnes	Brockville	Leeds.
London	Daniels, Elma E.	Alvinston	Lambton.
Toronto	Gibbons, Nina B.	Leamington	Essex.
Toronto	Gott, E. Edna	Amherstburg	Essex.
Ottawa	Hagerman, Arlissa	Athens	Leeds.
Toronto	Hamshaw, A. Elizabeth	West Toronto	York.
Ottawa	Huffman, F. H.	Colebrook	Addington.
Ottawa	Jamieson, Florence E.	Stanstead	Quebec.
Ottawa	Johnston, Maude	Cornwall	Stormont.
London	Justin, Myrtle	London	Middlesex.
London	Jull, Alice	Norwich	Oxford.
Stratford	Kilty, Minnie E.	Clinton	Huron.
Toronto	Kennedy, Catharine	Sarnia	Lambton.
London	Keys, Geo. P.	Blake	Huron.
Stratford	Laing, Annie C.	St. Mary's	Perth.
Toronto	Lane, Etta	Toronto	York.
Stratford	Law, Isobel	Drumbo	Oxford.
Peterborough	MacKenzie, Jennie	Rathburn	Ontario.
London	March, Margaret	Dutton	Elgin.
Ottawa	McEwan, Annie	Martintown	Glengarry.
Toronto	McLeod, Catherine	Star	Peel.
Ottawa	Medcof, John D.	Holleford	Frontenac.
London	Moran, Anna	Essex	Essex.
Ottawa	Moss, Eldwin W.	Wales	Stormont.
London	Murray, Josephine	Wilton Grove	Middlesex.
Toronto	Myers, Nellie	Goodwood	Ontario.
Stratford	Neilands, Clara E.	Woodford	Grey
Toronto	Parker, Emily M.	Toronto	York.
Toronto	Phillips, Addie E.	Toronto	York.
Toronto	Russell, Lula	Walkerville	Essex.
Stratford	Sivell, Jean	Owen Sound	Grey.
London	Smith, Mary	Parkhill	Middlesex.
Stratford	Spearin, Nellie E.	St. Mary's.	Perth.
London	Thomson, C. C. E.	Aylmer	Elgin.
Toronto	Thomson, Juanita	Toronto	York.
London	Tiffin, Cora	Thamesville	Kent.

The Summer School.

The courses offered at the Summer School were: 1. Art and Constructive work; 2. Woodworking and Mechanical Drawing.

The instruction given at this course is recognized by the Department of Education, thus giving students who drop out from the full course an opportunity to complete their work at the Summer School. There were twenty-six students in attendance, 14 taking course 1, and 12 course 2. Seven were working with a view to qualifying for the Certificate of Manual Training. Of these, Mr. Joseph Slaughter, Toronto, completed his course by submitting his thesis and writing off his outstanding subjects—Applied Design, Plane and Solid Geometry, Construction and Theory of Manual Training. He was granted a Specialist's Certificate by the Department of Education and by the College, full course diploma. Mr. H. S. MacPherson, Simcoe, received from the Department of Education an Interim Certificate on his work in Woodworking, and taking his examination in Construction and in Tools, and Mr. T. T. Carpenter, Brantford, was awarded a Certificate in Manual

Training. Of the remaining four, two are doing Woodworking and Mechanical Drawing, and two are working at the Forging Course. All in attendance were granted the College Summer School Certificate. Those in attendance were:

Mr. J. E. Chambers, Guelph.
Mr. W. H. Flumerfelt, Guelph.
Mr. W. G. Ward, Guelph.
Mrs. J. Lyon, Guelph.
Miss E. MacMillan, Guelph.
Miss M. R. MacCallum, Guelph.
Miss F. V. Carter, Guelph.
Mr. W. R. Beattie, Toronto.
Mr. W. F. Darroch, Toronto.
Mr. J. Slaughter, Toronto.
Miss M. F. MacKenzie, Toronto.
Mr. H. S. MacPherson, Simcoe.
Mr. T. T. Carpenter, Brantford.
Miss M. Long, Brantford.
Mr. H. L. Ingram, Belleville.
Mr. D. N. Cornell, Cornwall.
Miss H. L. Martin, Waterloo.
Miss T. Smith, Lindsay.
Miss M. C. Davidson, St. Catharines.
Miss L. J. Smith, St. Catharines.
Miss A. E. McKowan, Avonton.
Miss I. H. Breakill, Madoc.
Miss N. Feeney, Madoc.
Miss M. Neelands, Forest.
Miss A. Neelands, Forest.
Mr. J. T. Curtis, Seaforth.

FALL TERM.

During this term the following classes were in session:

Farm Mechanics and Metal Work—Second Year Agricultural Students	94
Color and Household Decoration (Macdonald)	52
Woodworking (Macdonald)	24
Teachers' Normal Course	2

Through the kindness of the International Harvester Company, of Hamilton, a very profitable and enjoyable day was spent by the Second Year students in examining the large range of agricultural machinery produced by this world-famed firm. The boys were divided into groups of tens and placed in charge of guides who explained the various processes the materials were treated before being assembled into the different machines. By this arrangement every facility was given the students to obtain much serviceable information.

Donations of implements to Machinery Hall have been received from:

The Avery Company, Peoria, Ill.: 1 Perfection Corn Planter; 1 Corn Cultitor.

The Champion Potato Machinery Co., Hammond, Ind.: 1 Potato Planter; 1 Potato Cutter.

The Paris Plow Company, Paris, Ont.: 1 Plow, No. 10; 1 Riding High Lift Gang and breaker attachment for same; 1 Walking Plow, No. 15; 1 Plow, No. 21, with skimmer, coulter and wheel; 1 14 in. Combination Plow; 1 14 in. Brush Breaker Plow; 1 Riding Plow, No. 51; 1 Manure Spreader, No. 3.

I desire in conclusion, to express my hearty appreciation of the support and assistance received from Mr. E. W. Kendall throughout the year, and the conscientious, systematic and efficient services rendered by Mrs. Walter Misener, and Mr. J. A. Stiles, during the Spring term, and Mr. R. W. Wade in the Fall term. Their respective work was conducted with the utmost zeal, and the high standard of the department was maintained in the subjects of which they had charge; to thank those firms who have contributed so liberally to our implement and machinery outfit in Machinery Hall, thereby enabling us to cover more fully than we otherwise could the various kinds of implements employed on the farm; and to convey to the International Harvester Company our gratitude for their courteous and generous reception of the students when visiting the factory.

I have the honor to be, your obedient servant,

JOHN EVANS.

PART XIX.

THE PROFESSOR OF FORESTRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Forestry department for the year 1909:

The courses of lectures as outlined in the College Calendar have been delivered to the second and fourth year students. Special lectures were also given to the rural school teachers in attendance at the Nature Study course.

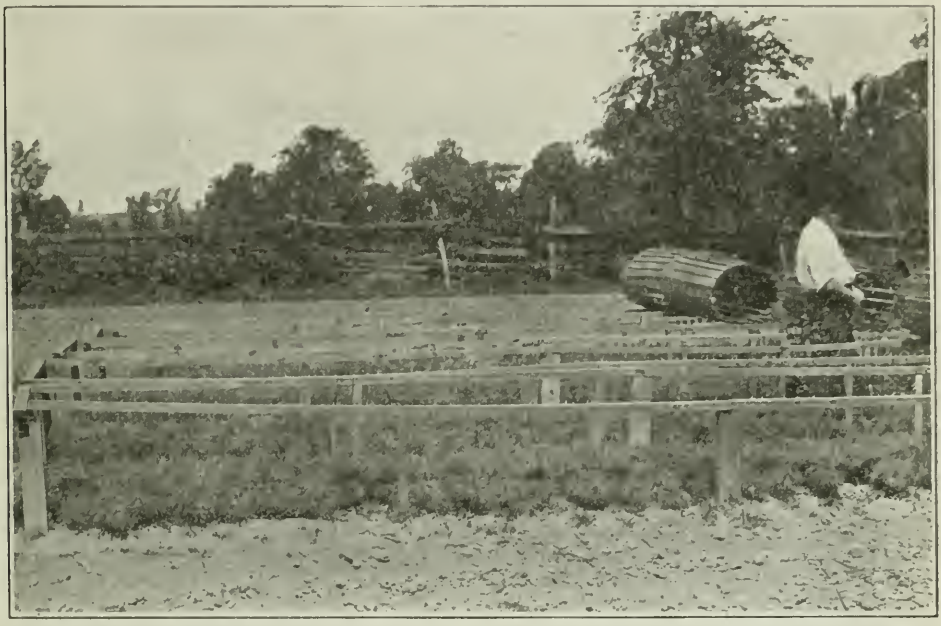


Fig. 1.—Two-year-old White Pine in seed beds. These plants are now ready to transplant.

COLLEGE WOODLOTS AND PLANTATIONS.

Owing to the fact that the labor of this department has been transferred to the Forest Station in Norfolk county, very little has been done in the College woodlots or plantations.

The vacant portions of the north and south woodlots have been filled in by planting with pine, spruce and walnut. These two woodlots are fully stocked and all that will be necessary in the future will be to thin out scrubs or remove mature timber.

NURSERIES.

Last year when moving the nursery stock to Norfolk Forest Station, it was necessary to leave the one year old White Pine seedlings, as they were too small to move.

These plants are now two years old and are ready for transplanting. There will be about 80,000 and they will be shipped to the nurseries in Norfolk.

Co-operative Planting.

During the last season about 380,000 plants were sent out to applicants. We had expected a larger demand, but a number of the applicants were unable to handle the work, owing to the extremely wet season last spring. The material distributed consisted largely of White Pine, Scotch Pine, Norway Spruce, White Ash and Black Locust.

The results in these plantations throughout the Province are very satisfactory, considering that the trees are usually planted on steep hillsides or other untillable soils. Many plantations contain from 80 to 90 per cent. of living trees.

Fig. .2—White Pine three years planted on a rough hillside without cultivation. These plants have grown about 18 inches during the last summer and should now commence a rapid growth as they are above the grass and weeds.

An interesting feature of the work is that a number of applications have come for material to plant up vacant spots in the woodlot. In our circulars the department strongly advocates the planting of evergreens such as White Pine or Norway Spruce, about the borders of the woodlot. It is difficult to keep forest conditions of soil and undergrowth in woodlots of small area where hardwoods or deciduous trees prevail. A border of spruce and pine gives the soil protection from the wind, which is one of the most important factors in insuring good tree growth.

Open spots on the interior of the woods should be planted with some of the more valuable woods. The department has been supplying White Ash and Black Locust for this purpose. Black Locust should prove a good tree in the woodlot as it grows very rapidly during its early life and produces fence, post and fuel material in from twenty to thirty years.

This last fall the department had collected nuts of Black Walnut, Butternut, Hickory and Red Oak. These were stored and will be distributed in the spring for planting in vacant spots in the woodlots.

Reclamation of Non-Agricultural Lands.

As intimated in last year's report (1908) our nurseries and field staff have been transferred to the Norfolk Forest Station. The Province has at this Station

Fig. 3.—Reclaiming waste sand land in Norfolk County by planting with Pine.

1000 acres of land which is being placed under forest management and on which is being developed a permanent forest nursery. The work being done at this Station will appear more fully in a separate report to be issued by the Department of Agriculture.

Respectfully submitted,

E. J. ZAVITZ.

PART XX.

THE PROFESSOR OF NATURE STUDY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Nature Study department for the year 1909.

The course given to teachers from April 19th to June 29th, marked the completest, most systematic effort of the College to bring its teaching to the boys and girls in our elementary schools. Ninety-seven teachers entered the work and ninety-two completed it; three withdrawing on account of ill health, one changing to the course in Industrial Arts, and one leaving to take a position. It was undertaken by the College on behalf of the Department of Education as a special part of the training of Normal School students. The aim of our work was to train teachers in the scientific principles and practices of modern farming so that the country or village school might adequately sympathize with and direct the life interests of country boys and girls. There was an acknowledgment in the effort that the country school owes something more and something new to the country boy and girl; that the great changes that modern science has brought about in modern industry and society must make for new adjustments in the work of the schools along vocational lines.

There was a recognition of the principle, too, that for a special work to be done in the schools, there must be a special training for teachers. If Elementary Agriculture and Horticulture or a vocational Nature Study is required to be taught, teachers must first be taught *what to teach and how to teach it.* Moreover the training must be of a real practical character; no mere telling how to do it, nor reading how to do it. It had to be as nearly real as it is possible to show the real in a training school. This feature of a training for the teachers of country schools necessitates the use of the Agricultural Colleges. Throughout the continent this use of the Colleges is being more and more accepted by the provincial and state educational authorities. Our work in this regard typifies a movement that is growing wider every year.

The initial movement here was favored in having a specially qualified body of teachers for its first class. Nearly all of them were born and brought up in the country; all of them had taught in country schools; many of them had already made efforts, without a special training, to teach some of the work in their schools; they had undertaken in their contract with the Department of Education to remain in Ontario for three years and as far as opportunity offered teach the subject along the lines of their special training here. Moreover they came to us accredited as Normal School graduates. They had passed their final examinations at Easter. They were, one might say, all successful, experienced teachers volunteering to equip themselves further for a higher or wider scope of work in the country schools. In giving such a body of students an insight into the meanings and problems of agricultural and rural life in general the College had an easy and encouraging task.

The carrying out of the course was not accomplished without some radical re-arrangements in the College routine. A number of the members of the teaching staff had to continue to take for the ten weeks' term as many classes as they had

had with the regular College students during the year, besides having to re-arrange the work and re-adjust their methods of instruction; this interfered in some cases with the experimental or investigational work which is ordinarily carried on in spring and summer by the departments of the College. The other members of the staff who gave fewer lectures, had to plan their work so as to meet the requirements of the time table; in many cases this was done without not a little inconvenience. As in all the College undertakings in the cause of agricultural education, however, our teachers gave of their time, talents and enthusiasm without grudging. Everyone was a ready and willing helper. This enthusiasm for the cause impressed itself too on the students—like teacher, like scholar; from their teachers they caught enthusiasm. We may hope in many cases this will be carried into their work, back in the little country schools, and as a little leaven, help to leaven the whole lump of education in the rural schools into something better than has yet been known.

The re-arrangement that seemed most radical was the turning of the College Residence for men into one for women. It may have appeared unfair to those who

Visiting school children in School Garden.

had to vacate pleasant quarters. It was to be regretted that accommodations would not permit the women students to carry on their work without encroaching on the apparent rights of the fourth year students remaining for their final examinations and the other students who stayed over to work on the farm. However, the business of the College is primarily to serve the cause of Agricultural education at large in the Province of Ontario, and the experiment in teacher-training looked to outweigh in its importance the comforts of a relatively few male students. The results justify the arrangements. For ten weeks the one hundred and thirty-five women attending the classes were surrounded night and day with an agricultural college environment. There were no detractions such as city boarding house residence would furnish. They were on hand always for evening lectures, gardening exercises, etc., or for early morning bird tramps. They formed close friendships and associations that broke down any tendencies to remain in separate groups representing the different Normal Schools. They became a unified body of Ontario teachers cemented in a common enthusiasm for the College and the carrying of its lessons to the boys and girls in country places. No one can measure the effects of their influence. It must be not inconsiderable for it will yearly reach thousands

of our youth when they are in the plastic stage and readily moulded or directed by their teachers. Residence life was not the least valuable part of their training here.

Efforts were made to have the work made known and also to have the teachers distributed widely. Ninety-seven teachers for the whole Province meant a wide separation between representatives, one or two for each county if they could be so placed. Lists were sent to the Inspectors and requests made for vacant schools where encouragement would likely be given to school gardening and agricultural teaching. In some cases an active interest was taken in securing our teachers, with the result that some inspectorates have a comparatively large representation of them. Of course the proximity of their homes and the salaries offered were determining factors, too. Most of the teachers were engaged at a salary of at least $500. A few are in receipt of $525 or $550, while a few others, taking schools near their homes, engaged for less than $500. As a rule the salaries offered in the western part of the Province were higher than those offered in the eastern part.

Teachers visiting Guelph Gas Works.

So far as I have been able to learn from reports made by the students, they are distributed in the schools, as shown by the following list. A few are not taking schools until the New Year. Doubtless the remainder are actively engaged in Ontario schools. We have endeavored to keep in touch with them all but as there is no official connection between them and the College after they leave us this is somewhat difficult to accomplish. It might be well for the cause if there was some means of following up their work in order to have it properly directed, unified, and reported upon. Scattered and isolated as they are in the country schools there is danger of their effectiveness being lost. Especially so if they should receive little encouragement or help from trustees or inspectors. It is desirable that they be held together as a coherent advance guard for the organized grand army of the "Ontario Special Rural School Teachers" that is to be. Besides the monetary encouragement ($30 per annum) they are to receive for acting as special teachers in Agriculture and School Gardening, there might well be some encouragement offered to bring them together periodically to the College for the renewing of their interest and the planning for concerted action and methods, in somewhat the manner that the High School Agricultural Specialists are brought to the Experimental Union in December.

A few of the class are engaged in graded town schools. The greater majority of them are in one-teacher rural schools.

County.	Student's Name.	School Section.	P.O. Address.
Algoma	Miss M. C. Wright	Graded, Urban	Blind River.
	Miss Bessie Christelaw	"	"
Brant	Miss Edna A. Twiss	9 Brant	Brantford.
	Miss Jessie R. Eakins	15 Burford	Fairfield Plains.
Bruce	Miss Lizzie Smart	11 Brant	Vesta.
	" Margaret Padfield	5 Brant	Walkerton.
	" A. M. Sillers	1 Brant	"
Elgin	Miss Florence Wegenast	11 Malahide	Aylmer.
Essex	Miss Margaret Whiteman	7 Mersea	Leamington.
Grey	Miss Emma Batterman	6 Sullivan	Desboro.
Grenville	Miss Edna M. Root	1 Augusta	Prescott.
Haldimand	Miss Mabel McClung	5 Rainham	Rainham.
Halton	Miss Myrtle Matthews		Acton.
Hastings	Miss Katie O'Rielly	Separate School	Tweed.
Huron	Miss Mabel Walsh	Lower Wingham	Wingham.
Kent	Miss Jean Schleihauf	6 Chatham	Eberts.
	" Lucy Kenny		Muirkirk.
	" Violet M. Savage	1 Oxford	Clearville.
Lambton	Miss Jennie McDonald	20 Plympton	Camlachie.
Lanark	Miss Anna McIntosh		Herron's Mills.
Lincoln	Miss Nettie A. Stewart	1 Clinton	Beamsville.
Middlesex	Miss Clara Loveless	19 London	Fanshawe.
	" Ella E. Baker	19 Westminster and Delaware	Littlewood.
	" Ella M. Doupe	7 Dorchester	Putnam.
	" Eliza McLauchlan	12 Caradoc	Melbourne.
Nipissing	Miss Lizzie A. Rankin	1 Kerns	Milberta.
Norfolk	Miss Maggie G. Hamilton	12 Windham	Brandy Creek.
Northumberland	Miss Gertrude Tucker	3 Haldimand	Wicklow.
	" Anna Brown	Town	Cobourg.
Ontario	Miss Laura G. Francis	5 Whitby & E.W.	Oshawa.
	" C. P. Vanvalkenburgh	5 West Whitby	Port Whitby.
	" Lilly E. Wilson		
Oxford	Miss Margaret King	8 Blenheim	Plattsville.
Perth	Miss Florence Millen	10 Ellice	Kuhryville.
	" Laura Fuller	1 Ellice	Stratford.
	" Elfleda Roy	6 Downie	Avonton
	" Gertrude Sprague		Trowbridge.
Peterborough	Miss Ella M. Dewart	2 Smith	Fowler's Corner.
Prescott	Miss Mary Watson		Pendleton.
Prince Edward	Miss Lulu Vickery	17 Hillier	Consecon.
Simcoe	Miss Eleanor Perrott	1 Essa	West Essa.
	" Bella E. Groves		Creemore.
Stormont	Miss Mary E. Eaman	17 Roxborough	Avonmore.
	" Jennie L. Harkness	Graded, Urban	Cornwall.
	" Edith Fetterley	8 Finch	Glen Payne.
Thunder Bay and Rainy River	Miss Gretta E. Fahey	Graded, Urban	Fort Frances.
	" Grace B. Jones	" "	Fort William.
Waterloo	Miss F. E. Monteith	13 Wilmot	Baden.
	" Annie M. Bell	1 Waterloo	Blair.
	" Annie M. Boal	16 N. Dumfries	Glenmorris.
	" Bessie Van Every	9 Waterloo	Waterloo.
	" Evelyn Ford	18 Dumfries	Galt.
Welland	Miss Mae P. McLelland	Wainfleet	Marshville.
Wellington	Miss L. E. Patmore	4½ Guelph	Marden.
Wentworth	Miss May S. Cody	8 Beverley	Ryckman's Cor.
	" Irene M. Clark	3 Ancaster	Ryckman's Cor.
	" Lena Field	7 Saltfleet	Tapleytown.
	" Myrtle Trainer		Aldershot.
York	Miss Grace Gilmour	22 King	Eversley.
	" M. C. Lloyd	13 S. York	West Toronto.
	" Mabel Patterson	12 Vaughan	Woodbridge.
	" Clara Williams	29 York.	West Toronto.

General Character of the Work.

The ten weeks' course was a very busy one. The work was mapped out so as to bring the students into touch with practically every department of the College with emphasis laid on the work in Agriculture, Horticulture, Botany, Physics, Entomology and School Gardening. The day's work was divided into four equal class periods of an hour and a half each. But each morning, commencing at 8.30 there was a half hour period devoted to religious exercises, and general discussions on the work at large and its applications in public school work. Frequently in the evenings there were lectures in English Literature or addresses by outside speakers.

In most of the subjects the detailed outline was satisfactorily completed. In a few there had to be a curtailment of the number of lessons owing to absence of the lecturer or to encroachments of examinations and term closing.

Much of the instruction was given out of doors in the fields, orchards, woods or campus, or indoors in greenhouses, stables or laboratory. All of it was of a practical character, accompanied by actual demonstrations, experiments, or lantern views. In a number of subjects the instructors presented their work in type-written outlines and synopses which they amplified by lecture and discussion; at the end of the course these sheets put together made quite a comprehensive text book in Agriculture for the teachers. This plan lends itself very well to short courses of instruction. It enables the instructor to cover his subject concisely, to place his topics in their proper and relatively important aspects, and to impart information without fear of its being misunderstood or wrongly recorded by his pupils. The advantages to the pupils are that it frees them from the necessity of elaborate note-taking, while acquainting them with good plans for recording lecture data, and giving them easily read records that are ready references for review or information.

The general health of the class was good, there being no more illness than might be expected amongst any corresponding number of teachers. Although due warning had been given to candidates by announcements made through the Normal School principals and in the circular issued by the Department of Education, that good robust health was a requisite for admission to the work and success in it, three students found themselves physically unable to meet the strain of the work and were forced to withdraw. A few others continued the work under physical disadvantages, and consequently were not able to get as much benefit from the course as they otherwise would. In no case, so far as known, was there any impairment of health through the exactions of our work. All instances of ill health mentioned above had their beginnings before admission here. On the other hand the health of most of the students was improved by the recreative character of the work in gardening, field tramps, etc. In subsequent classes the necessity of sound health should be insisted upon as a *sine qua non* for admission.

The complex character of the instruction to be given in a comprehensive course in Agriculture for teachers may be seen by a glance at the lists of subjects involved. Not one of them can be left out if justice is to be done the common interests of farming.

Studies relating to Plants and Plant Life: School Gardening, Botany, Horticulture, Agriculture, Forestry, Bacteriology.

Studies relating to Animals and Animal Life: Entomology, Animal Husbandry, Dairy Husbandry, Poultry Husbandry.

Studies relating to Physical Nature: Chemistry, Physics.

Economic Studies: Farm Life, Industries, etc.

Pedagogics: Methods of teaching the subject, etc.

Time Table.

The work was carried out in accordance with the following time table, excepting in the subject of Farm Carpentry. On account of the Manual Training department being fully employed with the class in Industrial Arts, this had to be cancelled.

——	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
9.00–10.30.....	Physics.	Entomology.	Physics.	Entomology.	Bacteriology,
10.30–12.00.....	Chemistry.	Botany.	Field Husbandry.	Botany.	Animal Husbandry.
1.30– 3.00.....	Field Husbandry.	Fruit, Vegetable or Landscape Gardening.	Forestry.	Farm Carpentry or Visits to Industries.	Experimental Botany, School Gardening Methods.
3 00– 4.30	Dairy Husbandry of Poultry.	Floriculture.	Field Work.	do	do

Visiting teachers receiving lessons on the campus.

Course of Study.

Below is given for each subject the outline of work prepared for the circular issued by the Department of Education with some details showing how the work was carried out. As the whole work is somewhat in the nature of a pedagogical experiment, these particulars may prove of value to other institutions that are about to undertake similar lines of work.

I. Farm Life and Allied Industries. Lectures will be given by Institute lecturers and others working for the improvement of conditions in the country—in school, home, and farm. Discussion will be held as to how the school and teacher can help towards an improvement. In this connection visits will be paid to country schools; students will also be made acquainted with the government publications and educational organizations. (About five lectures.)

Visits will be made also to local industries in Guelph to learn how urban activities are interrelated with those of the farm. (About four afternoons.)

Instructor—Prof. McCready.

In this part of the course we had many helpers. Miss Yates, one of the leading workers in the Women's Institutes of the Province discussed the question of improving the position of the women in the country and the conditions of labor, and showed how the teacher and Women's Institute workers could co-operate.

Senator McColl, of Victoria, Australia, who visited the College on an inquiry into agricultural education in America, spoke to the class regarding the work and status of the teachers in Australia, showing how they were organized there as a strong body of civil servants.

Dr. Robertson, Principal of Macdonald College, Quebec—the man whose plans in the founding and organizing of the Macdonald Institute were meeting fulfilment in this very class—gave two addresses. In one he discussed the necessity of the teacher's re-adjusting her ideals of education so as to ensure the child's receiving instruction that would help it to better adjust itself to the world of nature about it and the work-a-day world with which modern society environs it. In the other he appealed to teachers for the inculcating of a higher patriotism, and the giving of a whole-hearted service so that Canada might attain to its best possibilities in homes and citizenship.

The class came into personal touch too with a party of distinguished American educators who visited the College in June.

Dr. Frissel, President of Hampton Institute, Virginia, outlined to the class the problems of education amongst the negroes of the Southern States, and pointed out how their hopes lay in the training of industrial leaders and teachers at Hampton and the Booker Washington institution at Tuskeegee.

Dr. Glen, the General Manager of the Russell Sage Foundation, spoke on the nature and methods of the social reforms made possible by the munificent bequest of Mrs. Sage—the organizing of play grounds for children, the improvement of tenement districts in crowded cities, and the encouragement of schools in places where education was at a low ebb. Mrs. Glen, who accompanied her husband in his visit, spoke on the problem of negro education, and Mrs. Mumford, whose work lies in educational reform in Virginia, outlined their plan for improved schools and teachers amongst the white population in her state.

Rev. J. Anthony, of Agincourt, Ont., a gentleman who has given considerable study to the rural life problems of Ontario, spent a day in visiting the class and addressed the students on the difficulties and possibilities of the teacher's work in the country—the need for leadership and enthusiasm in our country schools.

Dr. Coleman, Vice-Principal of the Faculty of Education of the University of Toronto, addressed the class on *"Some Educational Ideals."*

Dr. Merchant, Inspector of Normal Schools under the Department of Education, during his inspectoral visit to the classes, addressed the students and directed their attention to the special field of work that they were being prepared for and the necessity for putting the instruction to practical use in the education of children.

In June Mr. L. H. Newman, B.S.A., Secretary of the Dominion Seed Growers' Association, addressed the class on the work of that organization; explained the principles on which seed is improved and showed how necessary this was for good farming and how teachers might introduce their pupils to the work.

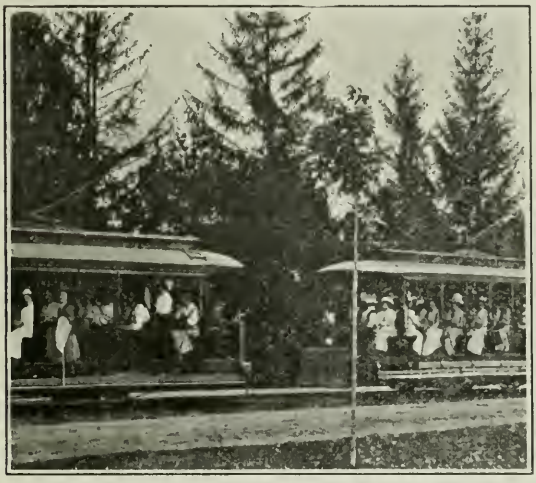
Mr. D. Young, Principal of the Guelph Public Schools, addressed the class on the aims and plans of the Ontario Teachers' Alliance, and as a result a branch was organized. Further mention is made of this elsewhere.

The class visit to Marden School was very enjoyable and profitable. This is a country school located two miles from the end of the Guelph Street Railway track in the midst of a splendid agricultural section devoted chiefly to stock raising. There is a good school-master's residence in connection with the school

and the teacher, Mr. P. H. Buchanan, has been carrying on School Gardening for the past three years. After hearing recitations of some of the classes, the students examined the school library, the children's books and exercises and then adjourned to the school garden, where the work was discussed in all its details with Mr. Buchanan. An impromptu concert followed by lunch and games preceded the tramp home in the evening. The insight that the teachers get into the work of a real school garden in a real country school such as that at Marden is of great advantage in the actual planning of similar gardens elsewhere.

A profitable afternoon was spent also in a visit to the Guelph Collegiate Institute. The official inspection of the school cadets was witnessed outdoors, and an exhibition of calisthenics and marching by the girls in the gymnasium. Afterwards the class was entertained in the school by Principal Davison and his staff by lantern demonstrations in the science room, an inspection of the pupils' exercises in drawing, etc.

Much pleasure and profit resulted also from visits to factories and industries. One can hardly speak too highly of the kindness and consideration shown the



Teachers en route to Marden.

classes. In all cases guides were put in charge of sections of the class to explain processes. In this way studies were made of the manufacturing processes in the Guelph Gas Works, Tolton's Agricultural Implement Works, The Guelph Waterproof Clothing Factory, Tolton's Paper Box Factory, The Guelph Carpet Works, The Guelph Spinning Mill, Raymond's Sewing Machine Factory, Raymond's Cream Separator Factory, Bell's Organ and Piano Factory, and Goldie's Flour Mills and Barrel Factory. At Mr. Goldie's the class was generously treated, too, to a view of his splendid collection of paintings and his wild flower gardens.

On May 27th the classes paid a visit to Galt—the Manchester of Canada—and were kindly taken in hand by the Board of Trade for an inspection of the town and some of its leading industries. En route a visit was paid to the large establishment of the Forbes Company at Hespeler, where every process in the making of woollen cloth was exemplified and explained. At Galt the class broke up into sections for visiting the different large iron-working establishments as well as the knitting mills and shoe factories.

To most of the students these inspections of our large industrial concerns came as a revelation of the possibilities of manufacturing in Canada as well as bringing new thoughts to their minds regarding the need of the school's giving special lines of instruction for those who are to be the workers in these industries.

Several of the publications of the Dominion Department of Agriculture, Ottawa, and the Ontario Departments of Agriculture and Education, Toronto, were given into the hands of each student and their use in the School Library shown and discussed. It is felt that one of the important lines of work for the teacher of Elementary Agriculture lies in the directing of the pupils in the schools to the uses to be made of the free government publications, thus making the schools active partners in furthering governmental aims towards the dissemination of technical information.

II. School Gardening. Brief sketch of the development of school gardening in Canada and abroad; its aims as a school study; laying out of a garden; individual plots;

Teachers' class visiting Marden School Garden.

class plots; teacher's plots; experimental plots; forestry plots; borders, keeping of tools, home gardens; keeping of garden records; observation in gardens at Marden School and Macdonald School; school exhibits (4 lessons).

Each student will be provided with a garden for practice and observation. After the gardens are planted the work in them will be carried on without special provision on the time table.

Instructors.—Prof. McCready and Miss Varley.

There was some delay in commencing this work last spring on account of the backwardness of the season. The class entered on April 19th but it was not until May 8th that the ground was fit to work—on May 2nd there had been indeed a heavy snowstorm. In spite of this delay, the gardens as a whole were well advanced when the term closed on June 30th.

Up to May 24th, when she left to take charge of a school garden under the Board of Education in Philadelphia, I had the assistance of Miss E. Varley. As she was a graduate of the Swanley Ladies' Horticultural College, England, and had

taken a year's instruction at this College in special studies relating to Gardening and Nature Study, she was of great assistance in getting the garden organized and the practical work started. A Committee and Garden Superintendent selected from the class helped in the management of the work afterwards.

The garden was laid out to allow each teacher a plot either 4 ft. x 10 ft. or 5 ft. x 10 ft. Side paths were two feet wide and end paths three feet. The work was closely associated with the gardening carried on at the Macdonald Consolidated School; our plots lay on the north and east sides of the children's plots and our teachers were thus able to observe from day to day the work of the children.

There were two classes of plots in the garden. Half of them were special Observation or Experimental Plots that were outlined and arranged for before the class commenced, as a series of suggestive school plots. The teachers were left to their own freedom in planning the remaining half. Each two teachers had one prescribed plot and one individual plot to take charge of; a rake was allotted to

A teacher and her class from Haldimand Co. visiting the College in June.

one teacher, the other had a hoe. There was a supply of spades, digging forks and hand weeders available for general use.

The class worked together in preparing the ground and planting the seed. Afterwards the work was carried on at the convenience of the individual teacher. Generally speaking, the weeding or watering was done as an evening recreation; some paid their visits in the morning. Each teacher was expected to visit her garden each day and record her work and observation in a garden diary. At class assembly each morning garden observations were reported and discussed.

The following school garden plots were represented in the teachers' gardens:

EXERCISES IN ELEMENTARY AGRICULTURE AND HORTICULTURE ARRANGED FOR USE IN TEACHERS' CLASSES.

OBSERVATION AND EXPERIMENTAL PLOTS FOR THE SCHOOL GARDEN.—In the plots outlined below there are represented most of the common cultivated plants grown in our fields, forests and gardens. One plot will be placed in charge of two students. The plots should be labelled plainly so that everyone in the class may understand what is being done. It is hardly necessary to say that it is not intended that such an extensive work

should be repeated in every small School Garden that may be commenced in the Province. But what is intended is, that in these, teachers will find suggestions from which they may select a few suitable plots to represent this important side of School Garden work. Besides an observation plot, each pair of students will carry on independently selected work in a garden plot adjoining.

Representing the Work of the Experimental Union, Schools' Section.

Schools' Experiments Section—These plots are for Rural Schools particularly.

1. 4th Class Plot—Agriculture—Different species of Wheat.
2. 3rd Class Plot—Forestry—Different species of Maples.
3. 2nd Class Plot—Horticulture—Different kinds of Onions.
4. 1st Class Plot—Floriculture—Climbing and Dwarf Nasturtiums.

Children's Gardening Section—These plots are for Home or School Gardens. Seeds are provided to children at a nominal cost.

5. Junior 1st—Nasturtium and Lettuce.
6. Senior 1st—Sweet Peas and Radish.
7. Junior 2nd—Pot Marigold and Beets.
8. Senior 2nd—Corn Flower and Spinach.
9. Junior 3rd—Petunia and Beans.
10. Senior 3rd—China Pinks and Carrots.
11. Junior 4th—Verbena and Onions.
12. Senior 4th—Asters and Sweet Corn.

Representing Farm Crops.

General Classes:

13. Wheat, Oats, Barley.
14. Rye, Buckwheat, Flax.
15. Field Peas, Field Beans, Vetches.
16. Mangels, Sugar Beets, Field Carrots.
17. Swede Turnips, Fall Turnips, Kohl Rabi.
18. Potatoes, Pasture Rape, Kale.
19. Corn, Sugar Cane, Broom Corn.
20. Alfalfa, Sainfoin, Clover.
21. Hungarian Grass, Common Millet, Timothy.

Special Classes:

22. Wheat—Red Fife (Spring Wheat for Flour); Wild Goose (Spring Wheat for Macaroni); Dawson's Golden Chaff (Winter Wheat for Flour).
23. Oats.—Early Ripe (Spreading Head with White Grain); Tartar King (Side Head with White Grain); Joanette (Spreading Head with Black Grain).
24. Barley—Mandscheuri (Six-rowed and Bearded); Success (Six-rowed and Beardless); Two-rowed Canadian (Two-rowed and Bearded).
25. Buckwheat—Japanese (Dark Brown Grain); Silver Hull (Light Silvery Grain); Rough (Notched Grain).
26. Rye and Flax—Prolific Rye (Spring Variety); Mammoth Rye (Winter Variety); Common Flax.
27. Field Peas.—Canadian Beauty (White Peas); Early Britain (Greenish Brown Peas); Prussian Blue (Blue Peas).
28. Field Beans.—Prize Winner (Small White); Marrowfat (Large White); Red Kidney (Large Red).
29. Cow Peas and Soy Beans—Whip-poor-will (Cow Peas); Early Yellow (Soy Beans); Medium Green (Soy Beans).
30. Vetches and Grass Peas—Common Vetches (Spring Variety); Hairy Vetches (Winter or Spring Variety); Grass Peas.
31. Mangels—Mammoth Long Red (Long Red); Yellow Leviathan (Yellow Intermediate); Ideal (Yellow Tankard).
32. Sugar Beets.—Giant White Feeding (Large White); Royal Giant (Large Red or Pink); Kleinwanzlebener (Medium Size, White).
33. Field Carrots.—Long White Belgian; Improved Short White; Rubicon Half Long Red.
34. Swede Turnips—Sutton's Magnum Bonum (Purple Top); Carter's Invicta (Bronze Top); White (Greenish Top).
35. Fall Turnips—Early American (Purple Top, Flat); White Egg (Round); Cow Horn (Long).
36. Kohl Rabi—Early White Vienna; Goliath Purple; Garton's Large Green.
37. Potatoes—Empire State (White); Early Fortune (Rose); Stray Beauty (Red).
38. Rape and Kale—Dwarf Essex Rape (Biennial); German Summer Rape (Annual); Thousand Headed Kale.
39. Corn—Henderson's Eureka (Dent); Salzer's North Dakota (Flint); Golden Bantam (Sweet).

40. Sorghum—Early Amber Sugar Cane; California Golden Broom Corn; White Kaffir Corn.
41. Millet—Japanese Panicle (Shiny Brown Seed); Japanese Barnyard (Grey Seed); Japanese Common (Yellow Seed).
42. Native Grasses—Red Top; Kentucky Blue Grass (Round Stem); Canadian Blue Grass (Flat Stem).
43. Foreign Grasses—Timothy (Roundish Seed); Orchard Grass (Long Seed); Tall Oat Grass (Bristly Seed).
44. Clover—Red (Red Blossoms); Alsike (Pinkish Blossoms); White (White Blossoms).
45. Perennial Crops—Alfalfa or Lucerne (Seed small and kidney shaped); Sainfoin (Seed large and kidney shaped); Burnet (Seed four-sided).

Representing Experiments with Potatoes.

46. Comparison of Different Sized Tubers Used for Planting:
A—Whole Potatoes, 8 ounces each; B—Whole Potatoes, 4 ounces each; C—Whole Potatoes, 2 ounces each.

47. Comparison of Different Sized Sets:
A—Each piece with one eye and weighing 2 ounces; B—Each piece with one eye and weighing ½ ounce; C—Each piece with one eye and weighing ¼ ounce.

48. Comparison of Sets With Different Number of Eyes:
A—1 ounce pieces with one eye in each; B—1 ounce pieces with three eyes in each; C—1 ounce pieces with five eyes in each.

49. Comparison of Different Number of Pieces in the Hills:
A—2 ounce potatoes, one whole potato in each hill; B—2 ounce potatoes, two half potatoes in each hill; C—2 ounce potatoes, four quarter potatoes in each hill.

Representing Different Pasture Mixtures, With Weights Sown Per Acre.

50. Annual Pasture Mixture:
Oats (51 lbs.); Early Amber Sugar Cane (30 lbs.); Common Red Clover (7 lbs.)

51. Pasture for Seeding with Spring Crops:
Orchard Grass (3 lbs.); Meadow Fescue (3 lbs.); Timothy (3 lbs.); Alsike Clover (3 lbs.); Common Red Clover (6 lbs.).

52. Permanent Pasture:—To be sown with Barley as a nurse crop.
Orchard Grass (4 lbs.); Tall Fescue or Meadow Fescue (4 lbs.); Tall Oat Grass (3 lbs.); Meadow Foxtail (2 lbs.); Timothy (2 lbs.); Lucerne or Alfalfa (5 lbs.); Alsike Clover (2 lbs.); White Clover (2 lbs.).

53. Testing the Values of Seeds of Different Qualities:
A sample of seed wheat graded into (1) large plump, (2) small plump, (3) shrivelled and (4) broken; planting two rows of each, and comparing the percentage of germination, rates of germination, and subsequent growth.

54. Representing a Three Year Rotation of Crops:
By sowing a crop of barley mixed with clover and indicating the succession of crops on a sign, *e.g.*, 1909 Barley (grain); 1910 Clover (hay); 1911 Corn (cultivated crop).

55. Inoculation of Clover Seed With Nitro-Culture:
Sowing one half the plot with clover seed that has been inoculated with culture procured from the Bacteriological Department and the other half of the plot with the same kind of seed but untreated. The comparison will be made by counting the nodules on the plants as well as measuring the relative growths.

Representing Common Vegetables Arranged in Their Natural Orders.

Cruciferae (Cress Family):
56. A—Cabbage, Cauliflower, Broccoli, Brussels Sprouts, Kohl Rabi, Kale, Swedish Turnips.
57. B—Horse Radish, Garden Cress, Radish (Globe, Long, Winter), Pepper Root, (from woods).

58. Leguminosae (Pulse Family):
Kidney Beans, Lima Beans, Windsor Beans, Scarlet Runner, Peas (Tall and Dwarf), Peanuts.

59. Solanaceae Order (Nightshade Family):
Tomato, Potato, Egg Plant, Red Pepper, Ground Cherry or Strawberry Tomato.

60. Compositae (Composite Family):
Salsify, Lettuce, Endive, Artichoke.

61. Liliaceae (Lily Family):
Asparagus, Garlic, Leek, Chives, Shallot, Onion.

62. Cucurbitaceae (Gourd Family):
Gourds (Mock Oranges, etc.), Bottle Gourd (Calabash), Pumpkin, Squash, Watermelon, Cucumber, Gherkin.

63. Chenopodiaceae (Goosefoot Family):
Beets (Globe and Long), Sugar Beet, Mangel-wurzel, Swiss Chard, Spinach.

64. Umbelliferae (Parsley Family):
Caraway, Parsley, Common Fennel, Celery, Parsnip, Chervil.

Labiatae (Mint Family)—An Herb Garden:

65. A—Sweet Basil, Lavender, Mint, Hyssop, Savory, Sweet Marjoram.

66. B—Thyme, Sage, Rosemary, Catmint, Horehound, Jerusalem Sage, Balm.

67. Vegetables for Salads:
Lettuce, Radish, Cress, Endive, Onions.

68. Medicinal Plants:
Castor Oil Plant, Horehound, Opium, Poppy, Tansy, Wormwood.

Representing Common Garden Flowers.

In this work much of the observation of flowers and full grown plants will need to be made in the College flower borders. Students will, however, be able to study the development of the plant from the seed and take away seedlings for further growing. In some cases roots of perennials may be secured from the Horticultural Department.

69. Ranunculaceae (Crowfoot Family):
Clematis, Double Buttercup, Columbine, Larkspur, Monkshood, Peony, Fennel Flower (Love in a Mist).

70. Cruciferae (Cress Family):
Common Honesty, Stock or Gillyflower, Alyssum, Wallflower, Rocket, Candytuft.

71. Solanaceae (Nightshade Family):
Petunia, Tobacco, Schizanthus (Butterfly Flower), Salpiglossis.

72. Papaveraceae (Poppy Family):
Celandine, Bloodroot, (from woods), Californian Poppy, Iceland Poppy, Common Opium Poppy, Oriental Poppy.

73. Geraniaceae (Geranium Family):
Oxalis (Shamrock), Common Scarlet Geranium, Lady Washington Geraniums, Nasturtium, Balsam.

74. Scrophulariaceae (Figwort Family) and Campanulaceae (Campanula Family):
Antirrhinum (Snap Dragon), Digitalis (Foxglove), Campanula (Canterbury Bells).

Compositae (Composite Family):

75. A—English Daisy, Aster, Garden Zinnia, Sunflower, Dahlia, Coreopsis, (Calliopsis).

76. B—Gaillardia, Chamomile, Chrysanthemum, Pot Marigold, Centaurea (Cornflower), Cosmos.

77. Miscellaneous:

A—Pansy, Pinks, Forget-Me-Not, Portulaca, Bleeding Heart.

78. B—Phlox, Heliotrope, Verbena, Periwinkle, Cockscomb.

79. C—Iris, Canna.

80. Wild Flower Garden:

Hepatica, Violets, Meadow Rue, May Apple, Baneberry, Trillium, etc. These might be planted alongside a fence or in a shaded place.

81. Wild Fern Plot:

Might be planted in shaded corner of school grounds or along the fence.

Representing the Propagation of Fruits.

82. Fruit Tree Seedlings:

Seedling raised from seed of Apple, Peach, Cherry, Plum, Pear.

83. Nursery Stock of Different Grades:

Illustrating the different grades of stock sold by nurserymen. The material will be furnished by the Horticultural Department.

84. Grafted and Budded Seedlings:

Illustrating the propagation of Fruit Trees by grafting and budding on seedlings.

85. Propagation of Small Fruits:

Cuttings of Gooseberries, Currants, Raspberries, Grapes, Strawberries.

Representing Forest and Shade Trees.

86. Seedlings From Woods:

Cedar, Beech, Basswood, Elms, etc.

87. Nut Trees and Oaks:

Hickories, Butternut, Walnut, Chestnut, Oaks.

88. Maples:

Different species as in the Union Schools' Experiment.

89. Conifers:

Pines, Cedar, Spruces, etc., grown from seed.

Miscellaneous:

90. A—Elms, Ashes, Birches, Cherry.

91. B—Catalpa, Tulip, Basswood, Horse Chestnut, Locust.

Miscellaneous Plots.

92. Common Climbing Plants:

Pole Bean, Scarlet Runner, Hops, Morning Glory, Wild Cucumber, Climbing Nasturtium, Cobea, Cypress Vine.

93. Fallow Ground:

Allowing the plot to lie fallow and produce plants from such seeds as may sprout; noting the number and species of the plants but not permitting weeds to seed.

94. The Effects of Commercial Fertilizer (Sodium Nitrate) in Growing Cabbage:

Treating Cabbage plants with small and repeated applications of Sodium Nitrate. Growing the same number and kind of plants on one half the plot, without applying the Nitrate.

Comparison of the Growth and Yield of Sprayed and Unsprayed Potatoes:

95. A—Spraying the plants with Bordeaux Mixture as recommended for ordinary potato culture to keep down the growth of Potato Blights.

96. B.—The same number of hills and the same kind of seed as in A, but leaving the plants unsprayed.

97. To Set Up and Care for a Hot Bed:

Use the bed for forcing any plants that may be required by other students. Keep a record of the temperature with maximum and minimum thermometers.

Special interest seemed to be aroused over the experimental plots with potatoes. The results are given for them. They show the possibilities of even small plots in the school garden. These experiments will be continued.

EXPERIMENT 46.—TO COMPARE THE YIELDS OF POTATO "SEED" OF DIFFERENT SIZES. (Four hills of each weight were planted in 5 ft. x 10 ft. plot.)

Weight of seed.	No. of potatoes.	Weights.	Total weight.
2 ozs.	17 small 13 large	6 ozs. 30 ozs.	36 ozs.
4 ozs.	21 small 21 large	8 ozs. 41½ ozs.	49½ ozs.
8 ozs.	12 small 19 large	5½ ozs. 52 ozs.	57½ ozs.

EXPERIMENT 47.—TO FIND THE RESULT OF PLANTING PIECES OF POTATOES OF DIFFERENT WEIGHTS, BUT WITH ONE EYE EACH.

Size of sets.	Product.	Weights.	Total.
⅛ oz.	3 small 4 large	¼ oz. 3¼ oz.	3½ oz.
½ oz.	5 small 7 large	½ oz. 16½ oz.	17 oz.
2 oz.	8 small 16 large	½ oz. 33½ oz.	34 oz.

EXPERIMENT 48.—TO COMPARE THE YIELDS OF PIECES OF THE SAME WEIGHT, BUT WITH DIFFERENT NUMBERS OF EYES.

Size of piece.	No. of potatoes.	Weight.
1 oz.—one eye	1 small 12 large	35¾ ozs.
1 oz.—three eyes	6 small 11 large	35¾ ozs.
1 oz.—five eyes	3 small 13 large	41 ozs.

EXPERIMENT 49.—TO FIND IF CUTTING UP EQUAL SIZED POTATOES INTO DIFFERENT NUMBERS OF PIECES MAKES A DIFFERENCE IN THE YIELD

Size of Seed.	Yield.
2 oz.—one piece	27¾ ozs.
2 oz.—two pieces	31½ ozs.
2 oz.—four pieces	31½ ozs.

In order to bring the work to the attention of visitors to the College and also to make it understood by those who might walk amongst the plots and not see their significance, explanation placards were placed here and there. For the cut these were photographed close together in a row.

The Department of Education seeks to encourage Gardening in the village and rural schools of the Province by offering a grant of $50 towards the initial expense of buying land, fencing, etc., and $30 annually for upkeep, provided a teacher holding a certificate in Agriculture is employed and carries out a scheme of instruction successfully. To such a teacher a personal grant of $30 is paid annually.

III.—Botany. (20 lessons).

1. *Economic plants :* Examination, description, and classification of common garden, field, and forest plants.

2. *Weeds:* Provincial Laws, Seed Control Act, Study and indentification of the seeds of common weeds. Collection.

Practical lessons in Plant propagation.

3. *Plant Diseases:* Study and identification of common fruit, vegetable and grain diseases; laws regarding Barberry, Black Knot, etc.; application of preventives and remedies. Collection.

4. *Experimental:* Students will be assigned simple experiments in plant physiology from the subjects listed below. These experiments they will demonstrate before the class:

(*a*) *The Seed:* Testing the vitality; determining the condition necessary for germination; how the seedling becomes established.

(*b*) *The Root:* How roots grow, their function; how they absorb food and water; proof of their using air and giving out carbon dioxide; quantity of water absorbed.

(*c*) *The Leaf:* The function of leaves, control and measure of transpiration; respiration; starch formation; behavior in light and darkness.

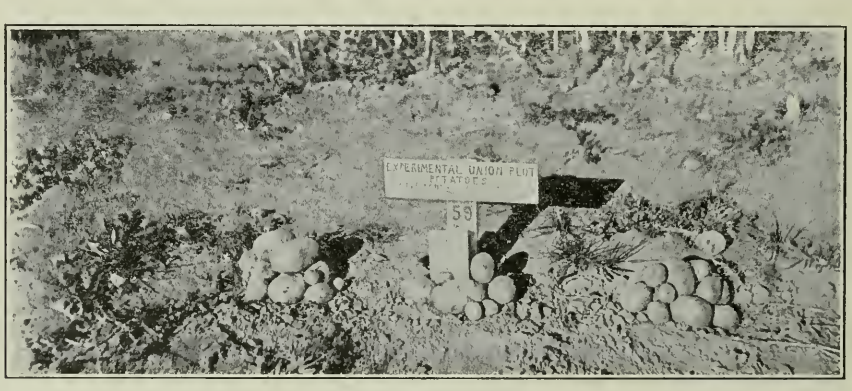
(*d*) *The Stem and Buds:* Forms, structures and functions of stem and buds; influence of temperature, moisture, light on growth; how the sap circulates.

(*e*) *The Flower and Fruit:* The functions of the parts of flowers; causes controlling the opening and closing of flowers; pollination; formation of fruits; devices for protecting and disseminating seeds; cross fertilization; plant breeding in experimental plots.

Instructors: Messrs. Howitt, Eastham and McCready.

This subject was one of those emphasized most as it is of fundamental importance in Agriculture, Horticulture and School Gardening. A treatment different from that ordinarily used in courses in Botany was attempted. It was carried out rather upon Nature Study lines than upon a strictly scientific basis. A practical acquaintanceship with common things was made amongst the weeds and weed seeds, trees, garden plants, field plants, and plant diseases. The ability to see and recognize was taught and tested. Text books were largely disregarded as were formal botanical classifications. The questions of what the plant was doing, what it was for, what the conditions pertaining to its welfare were, and how its life history could be demonstrated in school garden work were the important questions. Garden plants grown for their beauty did not monopolize attention; weeds, grains, vegetables received their due share.

In the experimental or physiological branch of the study, a complete set of simple exercises, treating of seeds and seedlings, growth in relation to the soil, to moisture, temperature, plant substance, reproduction, etc., was worked out by each student following out one exercise and teaching it to her classmates with practical



Potato Experiment.

demonstration of her methods in carrying out the work. All the exercises were such as might be taken with school children in connection with garden studies.

The following record by one of the teachers will illustrate the character of the problems and the method of recording the work.

Problem: My problem was to determine the amount of water in plants.

What was done: A.—I cut a quantity of green timothy, such as is used for hay, and weighed it. Then I dried it in the air and sun, and weighed again.

B.—I cut a quantity of green timothy, such as is used for hay, and weighed it. Then I subjected it to an oven heat of about 110 degrees C. to 120 degrees C. for a number of hours and weighed again.

What was seen: A.—Weight of green timothy,..... 16.2 grams.
Weight of dry timothy,..... 5.1 grams.
Loss of weight,..... 11.1 grams.
Percentage loss of weight,.... $\frac{11.1}{16.2} \times 100 = 68.52.$

B.—Weight of green timothy,..... 16.5 grams.
Weight of dry timothy,..... 4.3 grams.
Loss of weight,..... 12.2 grams
Percentage loss of weight,..... $\frac{12.2}{16.5} \times 100 = 73.61$

What was learned: A.—About 68.52 per cent. of this grass is water. That is, water that is loosely held and can be driven off by means of the sun and air.

B.—About 73.61 per cent. of water can be driven off by means of heat of about 110 degrees C.

IV.—Horticulture. (20 lessons).

1. *Fruit-growing* (4 lessons): Development, importance, needs, and outlook for the fruit industry; Governmental interest and action regarding shipping, marking, cold-storage, fumigation of nursery stock; experimental stations; co-operation in shipping; adaptation of various fruits to school garden work; arrangement and planting of the same;

Potato Experiment.

nursery practice in the propagation of trees and plants; principles of orchard management; pruning; spraying; cultivation.

2. *Vegetable Gardening* (4 lessons): Choice of vegetables for school gardens; preparation of soils; testing and planting of seeds; general care and cultivation; preparation and use of hot-beds and cold-frames; use of tools and implements.

3. *Landscape Gardening* (4 lessons): The principles of landscape gardening in relation to the laying out and beautifying of school and home grounds, including a practical study of the trees, shrubs, and ornamental features on the College campus and neighbouring school and home grounds.

4. *Floriculture* (8 lessons): Propagation and care of house and window plants; preparation of potting soils; bulb culture; making and planting of flower beds, annual and perennial borders.

Instructors—Messrs. Hutt, Crowe, Hunt.

As with the other subjects, the instruction in this was of a practical character. Every student in the class was taught and shown what good orcharding and gardening means, what to do and how to do it in the improvement and decoration of the school grounds; how to propagate common plants from cuttings, etc.; many of the lessons had practical demonstrations in the school garden in plots showing samples

of nursery stock of different kinds and ages, and strawberry propagation; the growing of seedling plums, peaches, apples, etc.

Lack of space prevents the detailing of all the subjects taken up in the course. The remaining subjects were treated in the same practical comprehensive way as those described above. From reports received from teachers these subjects are finding application in their teaching of their children, or in their associations with their pupils' parents.

V.—Field Husbandry. (20 lessons).—Importance of field crops in the national economy; systems of farming; rotation of crops; fertility of soil; cultivation of the land; classes of farm crops; uses of farm crops; varieties of farm crops; selection of plants; selection of seeds; improvements of crops by means of selection and hybridisation; practical tests in connection with Experimental Union; study of work being done in experiments with farm crops in Canada and in the United States.

Examination of field crops on neighboring farms; the work on the experimental plots; farm crops in the school garden; the agricultural museum; laboratory study of the root development of farm crops; types of seeds of grains, grasses, clovers, roots and fodder crops.

Instructor.— Prof. C. A. Zavitz.

VI.—Physics. (20 lessons).—Application of physics in farming; nature of soils, soil moisture, heat and air; principles of tillage and systems of drainage and cultivation; measurements of fields with the chain; identification of samples of soils; principles of common farm machines; meteorological records.

Instructors.—Prof. W. H. Day and Mr. R. R. Graham.

VII.—Entomology. (20 lessons).—Losses through insects in agriculture and horticulture; Governmental interest; classification of insects and laboratory study of types; common beneficial and noxious insects; out-of-door study and collecting in field, garden, orchard and forest; insecticides; a collection of insects properly mounted and labelled is required. Work of the Entomological Society of Ontario and the organization of local clubs in connection with it.

Instructors.—Dr. Bethune and Mr. Jarvis.

VIII.—Animal Husbandry. (5 lessons).—Development, importance, status of the industry in Ontario; histories and characteristics of principal breeds of live stock; types; stabling and care. Study of College stables and herds; exercises in judging with score cards.

Instructor.—Prof. G. E. Day.

IX.—Dairy Husbandry. (5 lessons).—Development, importance, needs, outlook, Governmental interest and action; markets and competition. Dairy breeds, care and stabling; individual cow-testing; care of milk and cream.

Observation of the process of Cheddar cheese making, curing, boxing, labelling, shipping.

Observation of the process of butter making, printing, shipping; milk-testing with lactometer and Babcock test; milk separation with hand separator.

Instructor.—Prof. Dean.

X.—Poultry. (5 lessons).—Development and importance of poultry industry in Canada; markets and competition; Governmental interest and action. Common breeds; feeding, housing; incubation; individual testing by trap nest; preservation of eggs.

Observation of natural and artificial hatching of chicks; care of young in brooders, feeding, etc.

Instructor.—Prof. Graham.

XI.—Chemistry. (10 lessons).—Agricultural Chemistry: Plant growth and composition, soils; manures and fertilizers.

Chemistry of foods: The chemistry of the food principles, *i.e.*, Protein, fat, carbohydrates and mineral matter; the function of these in the body, and the general characteristics of the different classes of foods. Simple experiments, such as might be carried on in public schools.

Instructors.—Profs. Harcourt and Gamble.

XII.—Bacteriology. (10 lessons).—Lectures and demonstrations exemplifying the work of bacteria in soil, dairying, plant and animal diseases; Government regulations

regarding tuberculin tests, killing of diseased cattle, stamping out of hog cholera, meat inspection, etc. An experiment on soil inoculation in the school garden.

Instructors.—Prof. Edwards and Mr. D. H. Jones.

XIII.—Forestry. (5 lessons).—Development of forestry work in other countries; value of lumbering industry; Canada's conditions and needs; laws and regulations regarding re-forestation and forest preservation; the establishment, care and protection of wood lots.

Identification of our forest trees; planting seed-beds in school gardens; work in College nursery and in the experimental bush; collection of weeds, etc.

Instructor.—Prof. E. J. Zavitz.

XIV.—Farm Carpentry, Etc.. (12 lessons).—Exercises in making articles needed in garden work, such as garden stakes and germination boxes. Instruction in the care of tools and the general repairing to be done about a school or home, such as cutting glass, puttying, painting, sharpening tools, inserting handles, mending gates and fences. Instruction in making working drawings of simple articles and the interpretation of such as are found in agricultural papers and farmers' bulletins illustrating farm buildings

Signs for making work understood.

and utensils. Observation of approved and up-to-date methods of stabling, fencing, road-making, supplying water, etc.

While this last subject could not be taken up under Prof. Evans, owing to his being fully occupied with the class in Industrial Arts, the matter was not lost sight of. The laboratory work bench and kit of tools were made of considerable use in the dozen and one needs of school gardening equipment and operations. While no systematic instruction was given, many learned little lessons in "doing things" —a very necessary ability where practical studies are to be joined with school work. The new regulations of the Department of Education encourages the provision of work bench and tools as a part of the equipment of country schools.

In the class excursions attention was always called to up-to-date improvements in farm machinery or other equipment.

In all these subjects the same general plans for making the instruction of a practical nature were employed. As nearly all the teachers had been brought up

in the country and had taught in the country, they were well informed regarding almost all phases of farm work or farm interests. They were possessed of a good intellectual foundation for receiving new ideas and suggestions readily.

English.

In addition to the subjects outlined in the official circular, a short course of lectures was given by Prof. Reynolds.

These were taken in the evenings and covered the following topics:

The Literature of Nature and Science Contrasted; Nature in Literature; Wordsworth's and Tennyson's Interpretation of Nature; Canadian Poets; other Canadian authors; the best books for rural school libraries.

In addition a lecture on the Drama was given by Professor Alexander, of Toronto University, and a recital of Shakespearian selections by Miss Field of the Toronto Conservatory of Music.

Examinations.

There was no formal written examinations at the close of the term. The experiment of doing without them was tried. It was felt that the putting of written examination tests on the instruction of ten weeks would cramp the work and spoil any inspirational effects that might result from having one taste of school work free of written tests. It was felt moreover that the instructors should be spared this work if possible.

Instead, the practical and recorded work of the term, collections and practical and oral examinations were the means used for grading in proficiency and adjudging whether candidates merited certificates. They were marked for the following:

Collections: (1) Plants, (2) Insects, (3) Seeds, (4) Weed Seeds.

Records: (1) Science Note Books, (2) Garden Journals, (3) Portfolios of Lecture Outlines.

Practical Examinations: (1) Identification of Plants, (2) Identification of Weed Seeds, (3) Demonstration of Physiological Experiment in Botany, (4) Garden Practice throughout the term.

Oral Examinations: Final review of all the work.

Conduct: (1) Regularity and Punctuality; (2) Application to study and demeanor in residence.

On the whole, this scheme of examination was found satisfactory.

If the more exact determination of the student's knowledge should be thought necessary written tests would need to be imposed. Great care would need to be exercised in the setting of such papers, however.

The Measure of the Value of the Course.

The teachers have not been sent away all-wise in the Art and Science of Agriculture and Horticulture. But they have been made, it is hoped, all alive to the problems and possibilities that await and surround the boys and girls who become their pupils. The good they may do will not be so much from the addition to their wisdom as to the increase of their sympathy and power to see and seize opportunities for directing and encouraging efforts to *do* something and *be* something.

The Use of the Training from the Teacher's Standpoint.

It is hardly possible at this stage of the experiment in teacher-training to measure its success or failure. The final test must be its efficacy in stirring boys and girls in the country to better thinking, feeling, and doing. It is a success in that the instruction received here is usable. Teachers are putting their instruction to practical use; not likely always with equal effect, but each in her own way according to her opportunity and ability. Some of them have voluntarily reported in the matter and excerpts from their letters are given to show the trend of the work and its possibilities in the hands of trained teachers:

"Every morning I take the first fifteen or twenty minutes for Nature Study. This fall we have obtained and identified the common weeds and wild flowers, besides observing, describing and naming the birds. . . . The third and fourth class have collected

Weed seed studies.

and mounted the weeds and wild flowers, the second class are making a collection of weed seeds. . . . Just now we are studying the apple crop—varieties, uses, value and exportation. . . . Everyone remarks on the interest taken by the pupils. Of course the work is new to them, but as yet I see no abatement of interest. . . . Since August we have bought some good reference books: *How to Know the Wild Flowers, How to Name the Birds, The Soil,* and Comstock's *Manual for the Study of Insects,* and several others, which have been of great value in our identification work. . . . . The instruction I received in the various Departments of the College has been invaluable to me both personally and professionally. . . . Our Inspector is very anxious that we have a school garden next spring. . . ."—*Elgin Co.*

"My pupils are busy just now with weed seed collecting. I procured an armful of cardboard boxes and a tinsmith's punch. They each cut out two rectangles 5 in. x 7 in. and punched holes in one of them; then pasted the two together (this is for mounting the seeds). Punching was done at recess and before nine. Before punching I had them draw a plan on paper and then on the cardboard, requiring them to be very careful in measurements. This was their first Manual Training lesson. I have the glass and passepartout ready for them when the seeds are mounted. We are having a weed seed competition some day soon, and are going to have the miller, who lives near, as judge. . . . We had a lesson on apples lately. . . . None of them had ever seen grafting or budding done. Some hadn't heard of such a thing. There are two crab-

apple trees in the playground. We are planning to have a man come next spring and give them a demonstration in grafting right on the grounds. . . . The trustees are taking the matter of School Gardening into consideration. The playground is rocky, etc."—*Lanark Co.*

"My course at Guelph has assisted me so much in my teaching that I thought it only fair to mention some methods I have adopted since commencing my duties in my little country school.

"Every morning directly after devotional exercises we have our observation talks, which sometimes last for half an hour. This is our plan:

1. *Date*—Tuesday, Oct. 12th.
2. *Kind of Day*—Bright and cool.
3. *Wind*—West
4. *Sky*—Blue and white.
5. *Temperature*—40°.
6. —*Remarks*—(1) Farmers hauling hay to town.
   (2) Fall apples are being taken to town.
   (3) Farmers are hauling in buckwheat.
   (4) To-day we had our first snow-storm for this fall.

"It is surprising how much the children enjoy these talks, and I have gained a lot of information myself. All farm operations, migrations of birds, current events, etc., are kept track of in the remarks. This exercise seems to brighten up the whole morning. Events such as Lieutenant Shackleton's trip and England's construction of new warships have been discussed, and the children have brought pictures illustrating these topics and these are put on the wall.

"In the early fall we collected weeds and pressed and mounted them, and these are up for inspection. The seeds of these weeds were also collected and put in envelopes, and they are up for inspection. My inspector was delighted with their work. I hope to have a school garden in the spring.

"My greatest drawback is the lack of a school library, and so far have not been able to persuade the trustees to secure one. I am going to keep at it, however.

"If all is well I intend taking advantage of the summer course next year."—*Waterloo Co.*

"I have, with the trustee's consent, started a school garden. We are intending to have one 25 ft. x 14 ft., and would like to plant varieties of winter wheat this fall. Would you furnish us with some of the best varieties? . . . One of the trustees suggests putting some of those in and also some the children are bringing from home."—*Wentworth Co.*

(Selected samples of the best four varieties produced at the College were sent.)

"The children are already gathering seeds and planning for our garden. Just the other day I had a weed test. I told the children to bring to school on Friday as many weeds as they could see on the way to school. All told, we had fifty different weeds. The fourth class knew from 47-50, and one little girl in the Part II. knew 46. No one went below 26.—*Wellington Co.*

"The pupils are ignorant of the common birds, weeds, trees, etc., so the Nature Study lessons are a source of great delight to them. . . . I am almost certain that the School Garden will be a success, for all in the section seem in sympathy with the project."—*Brant Co.*

"The pupils in this school had practically no instruction in Nature Study, so there are very many things they are anxious to know about. I expected to have difficulty in arousing their interest in it, but am happily disappointed. There is scarcely a morning that they do not have something interesting to bring to school. There are a great number of worms like the one enclosed, about which we are curious. We would like to know what they are."—*Welland Co.*

"We have been taking from fifteen minutes to half an hour each day. The children seem much interested in weeds, etc. We have not made provision for a garden yet. . . . . I think the size of the playground would warrant breaking up a part of it for an experiment along that line."—*Lincoln Co.*

The *Farmer's Advocate,* London, has been making some independent enquiries amongst the members of the class. The teachers were asked their opinions regarding the value of the training so far as it affected their teaching and whether the teaching of elementary agriculture and horticulture was feasible and worth while.

Remembering that all the teachers had had previous experience in teaching (and mostly in country schools) their answers are deserving of weight as to the possibilities of the work from the teacher's standpoint.

"Editor *The Farmer's Advocate:* In reply to your very enthusiastic letter of September 28th, I shall endeavor, as best I can, to make reply to your questions. If my feeble attempts should be of any value in following up the new movement *re* the improvement of rural education I shall be pleased.

"1. The course at the O. A. C. has quite considerably changed my pedagogical viewpoint as a rural teacher by enabling me to understand better, each day, that the only true way to educate rural school children is by bringing the children into touch with the common and interesting things about them, so that they may understand *why they do things.* It has enabled me to feel that we, as teachers, have many great difficulties to overcome, in the way of enabling the parents in our various communities to understand what it is to truly educate their children, so that they may not scorn the busy farmer, but be ready to do, and find out.

"2. I believe the chief thing of value in the course has been its enabling me to understand, myself, the true principles upon which the real teaching of agriculture and the study of nature rests, so that I can better find out and open up new ideas in the

Co-operation School Gardening.
Section of Boys' Garden after vacation August 18th, 1909.
Cape Croker School, Indian Reserve, Bruce Co.

methods of imparting such knowledge to the country boy or girl, by enabling them to do with their own hands, to see and find out.

"3. I do think the teaching of agriculture, or, as you state, the introduction of school-gardening, to be feasible and desirable.

"4. In the teaching of agriculture I find so many ideas crowding up into my mind *re* subjects interesting and helpful to be taught that I scarcely know which topic to make use of. The teaching of it is much easier than any such teaching formerly was.

"5. Since the opening of the term, I have generally taken a few minutes in the morning for reports on observations, or for discussion of something of interest which has been previously reported. Also, I take special lessons on plant and animal life, and some injurious insects affecting various crops. Then, too, the children and I have collected caterpillars, and made a suitable case in which to keep them over winter, daily observations being made on these.

"In regard to school-gardening, I have been discussing the matter with my trustees, with the parents whom I have met, and also with the Inspector, and I am trying to enable the people of the community to understand the value of having such work done at school. Now, I feel that I shall succeed in having the ground prepared this fall for a small garden next year.

"6. There are difficulties, the greatest being to enable the parents and trustees to understand the value of the school garden, and thus to consent to preparing even a part of the school-yard for the work. They are afraid to put any money into extra land for a school garden. To many people, new ideas are worthless.

"7. One suggestion I might make is that I think more of the work of teachers-in-training should be made to bear on such work, and thus ideas should be correlated; also, that the teachers should be given the best opportunities possible in the way of conveniences and helpful instructions while they are preparing for such work. I think it would be excellent to have a Normal School in connection with the Agricultural College, so that the teachers-in-training might practise the methods which they think would be best to adopt with children.

"Hoping my rather few disconnected ideas may be of some value to you, and that I may be able to make advancement along those lines as I continue the work."—*A Teacher, Southern Ontario.*

"Dear Sirs,—In reply to your favor of September 28th, I may say that while I have always thought that the instruction in country schools should be along practical lines, and of a broad nature, yet the course we received at the O. A. C. changed my viewpoint considerably. I think now that for those children who intend to remain in the country a special course in agriculture should be taken. If the child can be brought to a realization of the scientific basis of good farming, later his results will be better, his work more interesting, and his life pleasanter.

"As there is no better place for the teacher to fully realize all the possibilities of life on a farm than at the O. A. C., I think it would be very wise to have a Normal School in connection with it.

"The chief thing of value to me was coming in close contact with farming carried on scientifically."—*Teacher, Eastern Ontario.*

"The most valuable thing in the teachers' course at Guelph was the very close observation we were taught to use, and the habit of giving reasons for everything."

She considers the teaching of agriculture, nature study, etc., in the public schools, to be both feasible and desirable, but admits that she does not find teaching these things easy, because she does not know enough herself about "soil chemistry and physics." That she is trying to do her best, however, is evident from the concluding portion of her letter:

"I am trying to train the children to know more about their cattle, and apples, and trees and weeds surrounding us. They are interested and pleased.

"My difficulties lie in a lack of knowledge on my own account.

"For the length of time—10 weeks—the course at Guelph could not be better, nor carried out in a better way. For my own part, I need more time before I could teach agriculture successfully."—*Teacher, Wentworth Co.*

Teachers' Certificate in Agriculture.

The Department of Education now issues the certificates to teachers qualifying them for service in School Gardening and the teaching of Elementary Agriculture and Horticulture. The ninety-two teachers graduated in the spring Normal Class received this certificate. It was previously granted to Mr. E. A. Howes, Macdonald Consolidated School, Guelph; Mr. P. H. Buchanan, Marden, and Mr. W. W. Pettapiece, North Gower, these three being the first to receive it in the Province. These gentlemen had completed courses at the College and afterwards carried on successful school gardens.

Under the revised regulations (July, 1909) of the Department of Education, holders of this qualification are entitled to special grants. Provided they carry out a course of instruction in Elementary Agriculture and Horticulture through a successfully conducted School Garden they receive a direct personal grant of $30 per annum. The Board of Trustees employing such teacher receives also $30 per annum as an extra grant to be applied in this special work, and to assist them to commence the work a grant not exceeding $50 may be made to provide extra land, fencing, etc.

It is likely that quite a number of gardens will be commenced throughout the Province next spring by the teachers who have received certificates. It is not ex-

pected that all will engage in the work. Some of them are employed in schools where trustees do not wish to undertake gardens at present.

Summer School for Teachers, July, 1909.

The class attending the Summer School for Teachers in July of this year was the largest that has entered for this work during the six years it has been carried on. This increase in numbers marks in some measure a livelier interest amongst the teachers of the Province in the necessity for giving instruction to children along manual and vocational lines.

The work was carried out with the support and direction of the Department of Education. The Department officially encourages teachers to undertake this

Elementary Agriculture and Horticulture

This is to Certify that Miss L. E. Patmore

having attended the special session of the Ontario Agricultural College, Guelph, from April 19 to June 29 1909, and having passed the examinations prescribed by the Department of Education, has been awarded a certificate in **Elementary Agriculture and Horticulture**, valid during good behaviour.

Dated at Toronto this 30 day of July 1909.

Registered Number 55

R. W. Anglin, M.A. *Registrar*

R. A. Pyne *Minister of Education*

John Dearness *Superintendent of Education*

Form 47—500—July, 1909

special training by granting certificates to successful students. No tuition fees were charged, except to teachers non-resident in Ontario. For the four weeks' board at Macdonald Hall, a charge of $15.00 was made. The cost of the course, compared with that at many other summer schools is very small.

Instruction was given in two Courses, viz.: I.—*Nature Study.* II.—*Elementary Agriculture and Horticulture.*

Agriculture and Nature Study.

July Course in Nature Study. Fifty-three students took the Course in Nature Study. Most of them were from city and town schools, but the country schools were well represented too, there being more rural teachers in the class than in any previous year. The work was arranged so as to be an introduction to a second year's course in Elementary Agriculture. It included practical instruction in School

Gardening, Plant Propagation, the Identification of Weeds and Weed Seeds, Trees, Birds, Insects and Garden Plants. Lectures and demonstrations were given on farm animals and poultry, dairying and soils. Some members of the class plan to continue special lines of the work in subsequent years.

Miss L. F. Babion, Ridgeway, Welland.
Miss H. Barmby, Caledon East, Peel.
Miss L. G. Black, Rockwood, Wellington Co.
Miss A. Card, Marden, Wellington Co.
Miss I Card, Marden, Wellington Co.
Miss M. Chapman, Campbellville, Halton Co.
Miss L. Clyde, Eberts, Kent Co.
Mr. J. Corrigill, Elmira.
Miss M. Fowler, Oakwood, Victoria Co.
Miss M. Hawkins, Canton, Durham Co.
Miss A. Hayes, Trenton.
Miss A. M. Kyle, Colquhoun, Dundas Co.
Miss L. J. McKenzie, Glenarm, Victoria.
Miss H. McLennan, Hamilton.
Miss H. Savage, "
Miss A. Shier, Sunderland, Ontario Co.
Miss N. A. M. Banting, Toronto.
Miss E. Bruce, "
Mr. J. P. Cassidy, "
Miss L. Cheer, "
Miss L. Eaton, "
Miss L. A. Fawcett, "
Miss E. Fuller, "
Miss G. Gunn, "
Miss S. Hardy, "
Miss M. J. Dalton, "
Miss J. R. Brown, "
Miss E. Harmer, "
Miss W. Hogg, "
Miss F. L. Knowles, Toronto.
Miss A. A. Malcolm, "
Miss M. D. Moffatt, "
Miss G. Robb, "
Miss M. Robb, "
Miss J. Sharpe, "
Miss E. Tedd, "
Miss E. Winn, "
Miss E. Shillinglaw, Sarnia.
Miss E. Smith, Acton, Halton Co.
Miss L. Smith, Brantford.
Miss E. Smith, Acton, Halton Co.
Miss L. Smith, Brantford.
Miss M. C. Squair, Bowmanville.
Miss H. Stanley, Balderson, Lanark Co.
Miss E. Taylor, Norfolk, Virginia, U. S. A.
Miss C. Watt, Barrie.
Mr. D. Whyte, Forest.
Miss M. Eberhardt, St. Catharines.
Miss. L. McCutcheon, Thorndale, Middlesex Co.
Miss E. McGill, Bowmanville.
Mr. E. C. Robinson, Bluevale, Huron Co.
Miss E. McGill, Bowmanville.
Mrs. E. C. Grider, Louisville, Kentucky, U.S.A.
Mr. L. Might, B.A., Simcoe.
Miss Wilson, Washington, D.C., U.S.A.

Summer School for Teachers, July, 1909.

July Course in Elementary Agriculture and Horticulture. Six teachers took this Course this summer. With the completion of a Winter Reading Course they will be entitled to a Departmental Certificate similar to that granted to the Normal teachers who take the ten weeks' Spring Course. Their work included practical instruction in Chemistry, Bacteriology, Physics, Entomology and Botany, following up the work of a previous course in Nature Study.

Miss J. Lush, Berlin.
Miss M. M. Reid, Erin, Wellington Co.
Miss E. Sann, Virgil, Lincoln Co.
Miss M. Stewart, St. Catharines.
Miss L. Waterman, Bensfort, Peterboro' Co.
Miss V. Watson, Goderich.

The attendance of city teachers was relatively large. Toronto's representation numbered twenty-one—and from one school alone there were six teachers. Contrary to what might have been expected these teachers were most interested and enthusiastic in those parts of the work that were chiefly concerned with farming interests—the crops, the cattle, the poultry, the farm work. While in one sense, our chief concern is with the training of teachers for the country schools, it is satisfactory to think that the work commends itself for use in city schools, and that through the instruction of these teachers city children may be led to understand the work and interests of dwellers in country places.

The taking of the course by several teachers from the same school must commend itself. Such a body of teachers should be able to carry out a very comprehensive non-overlapping course of Nature Study in the different grades of their school.

It would appear that for the attendance of country teachers some additional means of encouragment will have to be found. For most teachers there is no attraction in spending a considerable part of their savings (the total cost of the course will be somewhere in the neighbourhood of $25) and four of their six weeks' holidays, without receiving more return than the satisfaction of doing better work for people who will be slow to reward enhanced service.

If means could be found of giving a summer school bursary to one selected teacher in each Inspectorate as a reward for good work in an effort to give instruction in Agriculture, we could have a splendid class of the very choicest teachers. Their influence afterwards in their own districts would be inestimable. We could, maybe, have in time through them one model country school in each inspectoral district of the Province.

There were two teachers in the class concerned in the teaching of High School work, Mr. L. Might, B.A., Science Master in Simcoe H. S., and Mr. J. Corrigill, of the Elmira Continuation School. The work in the July course should commend itself highly to those who teach the sciences in our High and Continuation Schools. The programme that they have to follow is very well covered in the instruction given in Botany, Entomology, Physics and Chemistry, and much of the work is along lines in which they have not had any training.

Indeed, if all our science teachers could have the agricultural viewpoint as a directing force or tendency in their teaching, it would not be long until the country teachers who are prepared in science in the High Schools would be naturally imparting Agriculture and Nature Study in their schools. And here lies the clue for the wide introduction of Agriculture into our High Schools.

Visits to Country Schools.

During the fall I had the privilege of visiting a few country schools in two counties. With Inspector Day I inspected five in Simcoe County, and with Inspector Standing three in Brant County.

There is good evidence of wholesome efforts being made to advance. Trustees are seeking to improve the school property and teachers are trying to adapt their teaching to the needs and surroundings of their pupils.

I was struck anew with the marked isolation of the country teacher. She (they are nearly all women now) is the most isolated worker in the field of education. In hardly any line of work are the workers more separated. Association with fellow-workers is limited pretty much to a two days' teachers' convention, once a year, and the half yearly visits of her Inspector. She has no direct means of com-

munication with the central educational authority, and likely knows little of the tendencies or changes of our system of education at large. Day after day she does her round of work associating only with children. She is likely to have little of the enthusiasm or aggressiveness that may be found in a body of teachers who are joined in a common cause, and working together day by day. Soon, she is likely to withdraw from the work or seek employment in graded urban schools.

Here lies one of the chief problems of the country schools: *To raise up a body of enthusiastic, organized, permanent teachers proud of their work and aggressive in it for promotion and recognition.* In some measure we hope to help in the solving of it with the issuing of the Schools' and Teachers' Bulletin; by getting them to co-operate in the School Gardening work; by training them as *Rural School Specialists.* "The rural teacher for the rural school" is one of our working mottoes.

Training of Teachers in Agriculture Elsewhere.

There are now four Normal centres for this work in Canada: The Nova Scotia Normal School at Truro, the Quebec Normal at Macdonald College, and the Manitoba Normal at Winnipeg, in addition to this College, are engaged in the work. In these Provinces every normal trained teacher comes under the influence more or less of the Agricultural Colleges. In Nova Scotia and Quebec the two schools are closely affiliated. In Manitoba the teachers spend one month in residence out at the College. Their first term opened May 11th last with an attendance of seventy-one. As in the courses here the entire time is given to the subject. Nearly every branch is touched on as shown by the time-table.

Note.—From 11 a.m. the classes will be divided into two sections, excepting in Animal Husbandry.

		9–10	10–11	11–12	1.30–3	3–4.30
Monday	A	Horticulture	Soils.	Field Husbandry.	Botany.	Animal Husbandry.
	B			Botany.	Field Husbandry.	
Tuesday	A	Botany.	Field Husbandry.	Soils.	Horticulture	Mechanics.
	B			Horticulture	Mechanics.	Dairying.
Wednesday	A	Dairying.	Entomology.	Field Husbandry.	Botany.	Dairying.
	B			Botany.	Field Husbandry.	Mechanics.
Thursday	A	Botany.	Field Husbandry.	Horticulture	Dairying.	Animal Husbandry.
	B			Soils.	Horticulture	
Friday	A	Animal Husbandry.	Veterinary Science.	Field Husbandry.	Botany.	Mechanics.
	B			Botany.	Field Husbandry.	Dairying.

Throughout the continent the work is finding an introduction in many places, particularly through Summer Schools.

STUDENTS TAKING AGRICULTURE AND NATURE STUDY IN COLLEGE AND UNIVERSITY SUMMER SCHOOLS OR SPECIAL TEACHERS' COURSES.

	1908.				1909.			
	Agriculture.	Nature Study.	Total.	Weeks.	Agriculture.	Nature Study.	Totals.	Weeks.
California, University of	8	.....	8	6	16	.....	16	6
Illinois, University of	25	.....	25	9	27	.....	27	9
Massachusetts A. and M. College	.....	.....	.....	4	160	.....	160	4
Michigan, A. and M. College	21	.....	21	4	28	.....	28	4
Minnesota, University of	70	.....	70	6	76	.....	76	6
Minnesota Agricultural College	90	.....	90	3	36	.....	36	3
Missouri, University of	21	.....	21	8	54	.....	54	8
Nebraska, University of	26	.....	26	6	.....	.....	.....	6
Nebraska School of Agriculture	53	.....	53	8	.....	.....	.....	8
North Dakota Agricultural College	.....	.....	.....	.....	20	17	27	4
North Carolina A. and M. College	13	.....	13	3	14	1	14	3
Ohio, State University	7	.....	7	8	.....	.....	.....	.....
Ohio, Miami University	35	90	116	6	26	40	66	6
Tennessee, University of	69	.....	69	6	.....	.....	.....	6
Virginia, University of	72	45	117	6	108	28	116	6
Wisconsin, University of	20	.....	20	.....	.....	.....	.....	.....
Chicago, University of	.....	.....	.....	.....	16	.....	16	6
Ontario Agricultural College	19	30	49	4	6	53	59	4
Manitoba Agricultural College	.....	.....	.....	.....	71	.....	71	4
Nova Scotia Agricultural College	.....	.....	.....	6	.....	.....	.....	6

In some cases the records have not been received.

CORRESPONDENCE.

The amount of correspondence of the department has increased considerably during the year.

There are many difficulties involved in having the department used as an Information Bureau, but many satisfactions, too. Our letter heads carry an invitation to use us, in these words: "This department is at the service of school inspectors, teachers, pupils and nature-lovers in all matters pertaining to the study of nature. Correspondence is invited regarding school-gardening, elementary agriculture, experimental work with plants, courses of study, text-books and methods of teaching. Help is offered in the study and identification of birds, insects and plants, in the preparation of nature collections, the keeping of nature records, etc." Some teachers send in material to be identified; others make inquiries about books, equipment or courses of study; pupils write under direction of their teachers to ask about birds chiefly.

Many inquiries are received from the United States regarding the teacher-training work and our extension work in School Gardening. This latter work alone has brought us into correspondence with about one hundred and fifty teachers.

O.A.C. BRANCH OF THE ONTARIO TEACHERS' ALLIANCE.

In the organization of a branch of the Ontario Teachers' Alliance amongst our students an effort was made to serve another side of the teachers' interests. As

a body of workers in a common field our Ontario teachers have been notoriously unorganized. This defect has been remedied recently by the commencement of the Alliance. In it the force of a combined membership is at the disposal of individual members for their protection, and the general promotion of their interests.

The O.A.C. Branch affords a centre for serving the needs of all members who may join from the teachers' classes in Domestic Science, Manual Training and Agriculture.

It was organized in June with Prof. Evans, President; Miss Bella Groves, Fergus, Vice-President; and Prof. McCready, Secretary-Treasurer. There is a membership already of about forty.

Trustee Associations.

Another of these Associations was organized in June of this year; this one known as the Dufferin County Trustees' Association. The Oxford County and North Wellington Associations have their membership restricted to rural trustees, but the Dufferin County Association embraces the trustees of urban schools as well. Most of the country schools (there are very few urban schools in the county) are represented in the organization. It augurs well for the progress of these schools when the trustees unite for discussion of their common interests and send representatives to the Provincial Trustee Association's Easter meeting at Toronto; the rural school will feel the benefit of the livelier interest that such measures will engender.

The teaching of Agriculture in the schools is one of the things that have been taken up at their meetings. On June 17th I dealt with this subject before the Dufferin Association at Shelburne, and on June 23rd before the North Wellington Association at Moorefield.

Teachers' Conventions.

Two of the best teachers' conventions that have ever been held at the College took place in June. On the 3rd and 4th the East and West Lambton Teachers' Associations met and on the 10th and 11th the East and West Kent Associations. In each case there were about two hundred teachers in attendance. They were well organized, and carried their programmes out well. Sometimes the teachers' conventions are disorganized through coming with a crowded institute excursion. In these cases there was no inconvenience or interference from such. It is suggested for other Associations that may purpose visiting the College, that they always come for two days and arrange their excursion for the last of May or first of June. By this time the school gardens of the Consolidated School and the Normal Classes are well advanced, and besides there are many opportunities at this time for outdoor studies on the campus.

The programme followed by the Lambton Associations suggests the line of work covered in such visits.

Programme.

Thursday—Afternoon.

1.30 to 3.45 p.m.—Visit to Agricultural College. Things to be seen: Dairy and Poultry Department, Massey Hall and Library, Experimental Plots, Museums.
3.45 to 4.30 p.m.—Visit to Consolidated School. Things to be seen: The Children's and Teachers' Gardens, Conveyances.

Evening.

8 p.m.—Meeting in Massey Hall. Addresses will be given by President Creelman on "Agricultural Education"; Dr. Bethune on "Common Insects"; Professor Hutt on "Improvement of School Grounds." Suitable music will be provided.

Friday—Morning.

9.00 to 10.30 a.m.—Visit to Macdonald Hall and Institute. While there Professor McCready will give an address on "School Gardening."
10.45 to 11.30 a.m.—In Massey Hall. Professor Harcourt will give an address on Chemistry of Foods."
11.30 a.m. to 12.00 noon.—Business meeting of the Associations. West Lambton Teachers will meet in Massey Hall and East Lambton Teachers in Massey Library.

Afternoon.

1.45 to 2.30 p.m.—Meeting in Massey Hall. Addresses will be given by Professor Zavitz on "Agricultural Wealth", Inspectors Conn and McDougall.
2.30 to 4.30 p.m.—Some practical Nature Studies on the campus, under the direction of Professor McCready.

For the musical and literary part of the evening entertainments we were able to use some of the talent of the Normal Class students.

During the fall I attended three conventions of teachers, and took up the question of School Gardening and the Teaching of Agriculture; the Dufferin County Convention at Shelburne on October 13th, that of the South Ontario teachers at Oshawa on October 21st, and the Brant County Convention at Brantford on October 22nd. A growing and practical interest in these matters is noticeable at these meetings.

Distribution of the O.A.C. Review in the Schools.

Two years ago free subscriptions to the College magazine were offered to such country schools as might make application for them. Last year about ninety schools received it. Owing to increases in the number of regular subscribers, it has been found necessary to restrict the term of such complimentary subscriptions to one year, and in order to ensure its best use in the school libraries it has been considered advisable to place it as far as possible through the hands of teachers who have received instruction at the College. Applications from trustees are not now accepted.

To assist in making the Review of direct interest to the teacher, arrangements have been made for the insertion each month of four pages of matter under the heading of the *Schools' and Teachers' Department.* It is proposed to have in each issue news or other matter pertaining to the work of each of the Macdonald Institute Departments, as explained in the sub-heading of the title and the foreword of the first number.

" Devoted to those interests of the Ontario Agricultural College which pertain particularly to the training of teachers for giving instruction in the schools of the Province along vocational lines—in Home Economics, Industrial Arts, Elementary Agriculture and Horticulture.

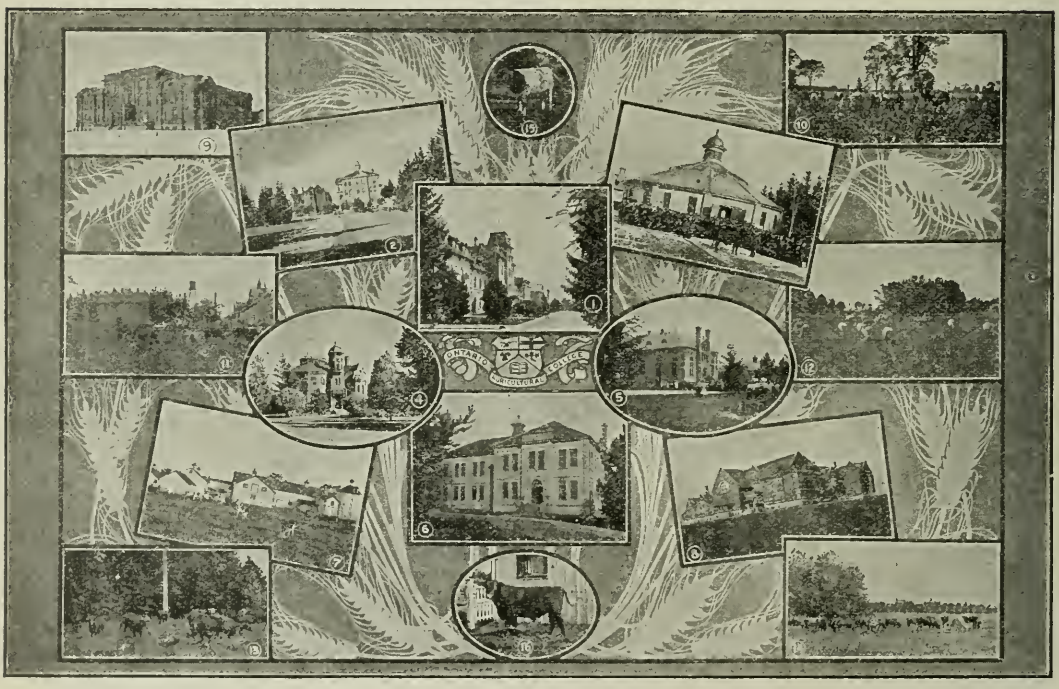
In this department of the College paper an effort will be made to hold together all our isolated workers in their scattered and several fields of endeavour; to keep open lines of communication between the College and all our teacher-students who care to regard the Macdonald Institute and Ontario Agricultural College in any respect as an Alma Mater; in every way possible, to help, encourage and direct those who represent us in the schools in the newer lines of educational work."

Arrangements have been made to distribute reprints of these pages amongst inspectors and other teachers.

From the requests received from teachers to be placed on the mailing lists, it may be inferred that many have their interests awakened to the possibilities of giving instruction along vocational lines to children in the public schools. It is hoped that our bulletins may help to stimulate and direct the cause as well as to hold together in some degree all those who have been trained here.

The Picture of the College in the Schools.

Requests for copies of the picture of the College continue. This is sent free to the schools on condition that it be framed and given a place on the wall. With the picture a sheet of instructions is sent to the teachers, outlining a series of simple lessons that may be taken up with the children on agricultural matters



through the medium of the picture. The picture is like the cut above, but having dimensions of 15″ x 20″. A good frame for it with glass will cost about a dollar. If the teacher wishes to have her pupils exercise themselves in *passe-partouting* the picture the cost will be very little. With pictures of the Farmers' College in every country school, the cause of agricultural education would grow unconsciously.

Teachers' Reading Course.

This course is continued this year with some slight changes. Instead of teachers sending in answer papers through the winter, they will hereafter present synopses of their reading at the time of entering the second summer term. On these and the knowledge of the subject displayed, their credit will be judged.

The selection of books is made to supplement the instruction of the first summer term and also to better equip them for the work of the second summer term.

For satisfactory work during the two summer sessions and in the winter reading course, the certificate in Elementary Agriculture and Horticulture is awarded. The reading course is thus accepted as an equivalent of two weeks of a ten weeks' course, as it were.

The course for the school year 1909-10 is as follows:

September and October—Hodge's *Nature Study and Life.*

November—Plumb's *Types and Breeds of Farm Animals.*

December and January—King's *The Soil;* Dunn's *Weather* (Optional).

February—Dean's *Canadian Dairying.*

March—Robinson's *First Poultry Lessons.*

April, May and June—Bailey and Coleman's *First Book in Biology.*

Extension Work in School Gardening.

During the year a Schools' Division of the Experimental Union was organized for the purpose of encouraging practical work in Elementary Agriculture and Horticulture in the schools.

The work was divided into two somewhat distinct sections. In one, known as the *Children's Gardening Section,* the Union offered to sell one cent seed packets to children for their own plots at home or in a school garden. In the other, known as the *Schools' Experiments Section,* teachers were offered seed free for four observation plots to be planted either in the school ground or in adjoining fields; these included a plot in Agriculture to show the seven different species of wheat, a plot in Forestry to show different maples, a plot in Horticulture to show the different kinds of onions, and a plot in Floriculture to show the different kinds of Nasturtiums.

For a commencement only the best teachers were wanted to co-operate and the names of these were secured through the Inspectors. In response to our offer applications were received from 116 schools for work in the *Children's Gardening* and from 22 schools for the *Schools' Experiments.* In all about 200 teachers took part in the work as several of the schools participating were graded schools.

More than 12,000 seed packets were sent out. As the distribution was limited to one packet of vegetable seed and one packet of flower seed to each child, this means that about six thousand school children received seed—a very good commencement for the work.

The reports on this work are very encouraging. There is no failure reported, although two teachers report *not successful.* With all the rest the verdict is *successful, very satisfactory, beneficial, quite successful, highly successful, encouragingly successful, very successful,* etc. Many interesting things are told about the pleasure the children had in it, the fine bouquets brought to school or sent to the sick, the successful fall fairs that were held, the splendid opportunities it afforded for good lessons in Nature Study, Art and Composition, the good effect of the work on the school discipline, the bringing of the school and home interests into closeness, the plans and ambitions for future work. One of the most interesting reports is that from an Indian School on the Cape Croker Reserve, Bruce County.

On the whole, it would seem that the scheme is commending itself to our teachers, and in many cases to the parents and trustees as well. It furnishes the teacher a ready means of making a commencement and brings with it, too, the encouragement that is aroused in working with others in a common cause and in

similar ways. Nearly all the teachers who have sent in reports ask to be notified of next year's plans, and signify an intention of continuing the work. Several intend to try the work in plots in the school grounds, thinking that they can control it better and get better results through the competition that will naturally arise. In discussing its effects on the children, several note the improvement in the school spirit and discipline.

Plans are under consideration for continuing the work and offering additional help to the schools in the work.

A fuller report of the work will be made in the Annual Report of the Experimental Union.

Visits of School Children to the College.

There has been quite a marked growth in this phase of work to report for 1909. In June, 1908, about twenty children from three country schools in Brant County joined the Farmers' Institute excursion for a day's educational outing with their teachers. Last June thirty-four teachers brought children. From Brant County alone there were nine schools represented. In all there would be between three and four hundred children. In some cases two or three schools would unite in one party. The visiting schools comprised:

From Waterloo County (June 8): Mr. Corrigill, Elmira; Mr. Richmond, St. Jacobs; Mr. Boal, West Montrose; Miss Zuelsdorf, Winterbourne.

From Elgin County (June 10): Mr. Campbell, Iona.

From Haldimand County (June 11): Miss Ida Bird, Canfield; Miss Ola Culp, Fisherville; Miss Kindree, Clanbrassil; Miss Jean Mitchell, Hagersville; Mrs. Carver, Jarvis; Miss McFarlane, Cranston; Miss Thomson, Canfield; Miss Hedley, Gill; Mr. Johnson, De Cewsville; Mr. Neill, Cayuga; Miss Marjorie Burrows, Tyneside; Miss Bessie Thomson, York.

From Lincoln County (June 11): Mr. H. Gayman, Jordan Harbour; Mr. Newhouse, Homer; Miss Eberhardt, St. Catharines; Mr. Forman, Grimsby; Mr. Comfort, Beamsville.

From Halton County (June 16), 22 pupils: Miss Heeks, Trafalgar; Mr. Newell, Nassagaweya.

From Brant County (June 17), 100 pupils: Mr. A. E. Beaton, Scotland; Miss Ella Smith, Burford; Miss Messacer, Scotland; Miss Maud Castin, Vernon; Miss Webster, Miss King, Onondaga; Miss Robertson, Fairfield Plains; Mr. Wilkes, Scotland; Miss Raynor, Onondaga.

From Perth County (June 18): Mr. A. L. Hartmeir, Moncton.

Of course many other children visited us with their parents, and doubtless received benefit from the day's sightseeing. But where the visit is made in class and as a school exercise under their own teacher, a special value must pertain to it afterwards in the many uses that are made of the experience in class work. It may often be a good starting point for the teaching of agriculture.

We were fortunate in being able to provide capable guides and instructors for the visiting children and teachers. Students from our Normal Classes were deputed to the work. They were excused from their regular class work for the afternoon of the day that their home institute visited us. As they had become practically acquainted by this time with the different lines of work in the different College Departments, they were able to explain what was to be seen in laboratories, museums, stables, fields and orchard. For the teachers it was a good exercise in

testing themselves as pedagogic guides in agriculture; they enjoyed the experience and received from the children's interests and questions new points of view for the teaching of the subject. As a rule they spent from half-past one to about half-past four with the class.

The movement is meeting with the encouragement and endorsation of school inspectors and further development may be looked for. The Inspector in North York issued the following notice to all his teachers:

Inspector's Office,

Aurora, June 10th, 1909.

To the Teacher
S. S. No.....
Dear.....

I desire to call your attention to the invitation extended to you and your pupils by the North York Farmers' Institute to join in their excursion on June 15th to the Ontario Agricultural College, Guelph. I shall be glad to have you and your pupils accept this opportunity of visiting the College, the Macdonald Institute, and the Consolidated School. For particulars as to railway rates see large bills and posters.

Yours truly,

C. W. Mulloy.

P.S.I. North York.

In South Ontario the following notice was printed and sent out to trustees and teachers:

Whitby, June 5th, 1909.

To the Trustees and Teachers of the Public and Separate Schools in South Ontario:—

Last year some of the Counties of Ontario had their schools join the annual excursion of the Farmers' Institute to Guelph. These counties were so pleased with the innovation that they are repeating the experiment this year.

It is the earnest wish of the Directors of the South Ontario Farmers' Institute that the teachers and scholars of the schools in this riding be given an opportunity to visit the Ontario Agricultural College. An officer of the college is to be detailed to give his particular attention to the teachers and to bring to their notice the features of the college work which are of particular interest to them. Special provision will also be made for the children.

Dr. Waugh, Public School Inspector for South Ontario, is also desirous that so far as possible, both teachers and scholars be free to make the visit.

To this end we would ask that Wednesday, June 23rd, be declared a holiday in each school section of the riding.

(Signed)

J. H. Hare,
District Representative Ontario Department of Agriculture.

Elmer Lick,
Secretary-Treasurer, South Ontario Farmers' Institute.

For many teachers the invitation comes at an inopportune time, as the examinations for entrance to the High Schools are close at hand and time pressing for the preparation of candidates. There is good evidence, however, that it is a profitable holiday for teacher and pupils alike. Teachers write:

"Certainly I consider it was beneficial in every sense, in broadening their minds and training their powers of observation. They were especially interested in the museum and hothouses. There was much to be seen that was comprehensive to the pupils of each class. It did not interfere with my regular school work, for they learned more that day by actually seeing for themselves than any teacher could possibly teach."—*Halton Co.*

"I would like very much to repeat the outing, but am unable to say whether I shall or not. But it was such a success that I am sure other teachers around me shall take it in the future. It was a great pleasure to myself to be able to take the pupils on such a beneficial and enjoyable trip."

"The educational value of the outing I'm sure was alone worth the time spent. In so many ways we shall make use of that trip. I had pupils from my second, fourth and fifth classes. In geography the railroad stations and crossings, the general aspect of country, the elevations, the undulating ground with picturesque hills, etc., were all duly noted. Difference in trees and flora were observed as we were passing along and compared with our flora of the Niagara district.

"I scarcely know of a day when I derived so much pleasure. . . . Then some of my girls take care of the chickens at home; so I had to show them the chickens. It was a revelation to them, all those funny feeding utensils, and I have no doubt by their examination of troughs, etc., that next winter the manual training will produce some of these or similar ones.

"I believe a trip like we had every year planned earlier and having a larger representation from our Public Schools would arouse a great interest in the Nature Study phase of our education."—*Lincoln Co.*

"I may say that I have heard the opinions of many of the parents as well as that of the school children and they all agree in saying that they think the trip was beneficial and that the day was not lost. It did not interfere with my regular work in school, as knowing for some time that we were going, I arranged my work accordingly. I have made no use yet of our experiences, except by conversations, but hope to be able to try some 'garden plots' in the future."—*Haldimand Co.*

"Regarding the educational value of our outing to Guelph, I believe the new experiences gained by my children will not only be remembered by them, but will benefit them in many ways. They have new ideas of the train, distance of a city outside of St. Catharines, of school gardening, of Nature Study; and they saw many things that had time been given them they would like to have had explained to them. I think that if our children could take an outing such as we had at Guelph oftener, it would tend to closer observation, clearer thinking, and more independence in drawing conclusions. . . . My boys are very anxious to get some bees and watch them at work; they think they might also get a collection of insects. The week after their outing they made a small vegetable garden of 120 square feet, and are quite anxious for a garden such as they saw at Guelph.

"Speaking from a knowledge of the children's enjoyment of the day, I would say that an outing each year would be thoroughly appreciated.—*Lincoln Co.*

Respectfully submitted,

S. B. McCREADY.

PART XXI.

THE LECTURER IN APICULTURE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit my first report in Apiculture.

First, as one of the increasing number in Ontario who are depending on this business for an income, let me thank you, sir, and the Department of Agriculture, for the interest shown in our industry by bringing the Ontario Beekeepers' Association under the direct supervision of the Department, by the increased grant for the inspection of apiaries, and by the appointment of a Provincial Apiarist for educational and experimental work.

As Provincial Apiarist, I was engaged during the summer in experimental work in an apiary established for the purpose at the Horticultural Experiment Station, Jordan Harbor. Six counties were also assigned me for inspection of apiaries. The educational work consisted of lectures given at the conventions of county beekeepers' associations, and at the Ontario Agricultural College.

At present the latter is confined to two lectures per week to the First Year Class during the Fall Term. Their attention had not been called to bee-keeping as a business. Many were prejudiced against it from a nervous dread of the irascible little insects it employs. Hence it was necessary to decide carefully what most valuable phase of the subject could be presented in a short lecture course.

The attention of the class was first called to the practical value of the subject in hand. Beekeeping is one of the most pleasant, healthful, and profitable of rural occupations. Pleasant because of the mysteries and problems of the teeming insect population of the hive, with their varied interests and ambitions; because duties connected with it are mostly out of doors in pleasant weather, and indoors when the weather is bad; because it is mostly clean, light work. It is healthful for the same reasons, and because the product is the purest and most wholesome of sweets. An apiary is profitable to the whole community by the increased fruit and seed production of the blossoms fertilized by the bees; and to the apiarist who, with the expenditure of some labor and experience, draws annual dividends of from 50 per cent to 75 per cent. on his cash investments.

It is unfortunate that a large percentage of beekeepers fail from lack of good management. This can be overcome only by education and training. Many a one owes success to early training received in the apiary of an experienced apiarist. Add to this training a scientific college course in the underlying principles of Apiculture and you have greatly increased possibilities for success.

After showing some of the advantages the attention of the class was called to some of the difficulties of practical apiculture. An imaginary visit was paid to an apiary in early spring, and the varied conditions of the colonies were used to illustrate the difficulty of wintering bees with uniform success. This showed the class that the wintering problem, for example, is a very real one. Then the changing seasons were brought into rapid review, and each shown to have its special difficulties in management. The most important ones were mentioned, and the remaining lectures were devoted to a discussion of these and of some of the established rules of management in each case.

Before the lectures could proceed it was found necessary for the class to gain a working vocabulary, with definitions of the more common terms, such as "colony," "apiary," "hive," "swarm," "queen," "worker," "drone," "larva," etc., also names of the parts of the hive and other things about the apiary.

To obtain any intelligent idea of the subject the underlying principles of bee nature must be mastered. Bees are not domesticated in the same sense as farm animals. They are simply wild insects induced to dwell near our homes by being provided with conditions most suited to their comfort and prosperity. It has been the purpose of the lecture course to describe these conditions, to give an outline of facts with which every beekeeper must be acquainted. Most of the students show a true interest in the subject and ask questions when given the opportunity. Some have asked for practical work and expressed a desire to specialize in the subject.

Owing to the lack of apiary and equipment no practical or research work could be attempted this year. It is expected, however, that the removal of this handicap will be commenced before another College year opens, as a nucleus of equipment is promised for the spring of 1910. The experimental apiary will be transferred from the Horticultural Experiment Station, Jordan Harbor, to the College Farm. A commercial apiary will also be kept at the Horticultural Experiment Station for the benefit of the fruit and for some experiments in the relation between bees and fruit.

I would strongly recommend that this subject be established regularly as a department of the College. There is no doubt that a full course in Apiculture would be increasingly popular. It will, of course, be necessary to have fully equipped apiaries for all kinds of experiments with bees and for the production of Comb Honey, Extracted Honey, and Queen Bees; also a laboratory for preparing honey in all kinds of experimental forms for market and for experiments in producing commercial beeswax, and for working out many other practical and scientific problems. When these are provided it will be possible to look to the graduating classes of the Ontario Agricultural College for valuable assistants and foremen of apiaries, trained inspectors of apiaries, queen-breeders, lecturers, experimentalists, and experts in all lines of apiculture.

Conventions.

In this work I attended conventions of county beekeepers' associations in Peel, Simcoe, Middlesex, Haldimand, Norfolk and Brant. This part of the educational work has great value in arousing local interest in beekeeping. Organizing leading men in the various counties also puts them in a position to secure better methods of production and better prices, and to present their needs more definitely before the Department of Agriculture. It will be wise for part of my time during the winter months to be spent in organizing some of the unorganized counties where beekeeping is extensively followed. I would also repeat a suggestion which I made in the "Canadian Bee Journal" some years ago, that there be a closer relationship between these associations and the Provincial Association. This might be accomplished by making the latter a sort of federation of the county associations.

Short Course in Apiculture.

To secure uniformity of action by the inspectors of apiaries, a special course of lectures would be of great advantage. While on their rounds they are expected to speak with authority on all subjects pertaining to the diseases of bees, the production of comb honey and extracted honey, the control of swarming, queen-rearing,

re-queening, etc., etc. In a short course of lectures, under the direction of a competent instructor, many good ideas would be brought out by discussion of various methods of bee-management. I am sure a course of this kind would be especially appreciated also by young men and women who desire to keep bees but are not in a position to take the full college course.

Status of Beekeeping.

Beekeeping in Ontario has made wonderful advances in the last few years. The time when it could not be mentioned without a smile and joke is happily almost past. The public is beginning to appreciate that it is a good business in which a few men have been making comfortable incomes for years. Men and women are looking to it for release from school-room and office. Bees are also receiving more friendly recognition from those who do not own them. Seed and fruit growers know them as their best friends in the fertilization of blossoms. Honey is a staple in the market with better and more uniform prices than have been known for some years.

These advances can be attributed to a great many agencies, such as the annual displays of honey at the Industrial Exhibition and the Horticultural Show in Toronto, and the newspaper reports of conventions. The beekeepers themselves are stimulated by these, and more especially by the visits of inspectors, whose coming arouses the careless or discouraged ones to the fact that their bees are a really valuable property and that there is hope of deliverance from the plague of foul brood. The opening up of the North-west Provinces has greatly increased the market for honey, and by no means the least stimulus is the work of the Crop Report Committee of the Ontario Beekeepers' Association.

The work of this committee is to send out forms to all beekeepers whose names are known, for a report of their honey crop. These are compared with last year's crop and prices and other things are taken into consideration, and all those who have reported their crop are advised as to the probable price of honey. The committee has shown remarkable foresight in naming prices for several years, and their reports are relied on by all leading producers and buyers in the province.

To enlarge the scope of this work I am compiling a card index of the names of all the beekeepers in the province, with the name of their post office, township and county. The cards are in duplicate, one set indexed according to the names of beekeepers, and the other according to counties and townships.

The information contained in such a set can be put to various uses, such as sending out bulletins and other free literature on beekeeping and allied subjects, assisting inspectors to find all the apiaries in their districts, etc. A record of the distribution of honey flora, on soil suitable for honey production, with special reference to territory not fully occupied by bees, would be of value to those desiring to locate apiaries. On the other hand, this department could be of great value to seed growers by supplying them with names of beekeepers who might be induced to establish apiaries close to their clover and buckwheat fields.

Inspection of Apiaries.

The counties assigned me for inspection of apiaries were Wentworth, Brant, Halton, Haldimand, Lincoln, and Welland. During the limited time at my disposal for this work I was able to visit only the apiaries where disease was strongly suspected. These were carefully inspected, and where disease was found the proper treatment was applied, effecting a cure in every case where sufficient attention

could be given. Through lack of time for this work some of the worst cases had to be left over till next season. Some of the other inspectors report the same condition in their districts.

The Foul Brood Situation.

One of the greatest hindrances to our industry is this contagious disease which exists in many parts of the province. To try to check it a provincial inspector of apiaries was employed for a number of years, but the disease was found to be rapidly gaining ground. Many prosperous apiaries were destroyed, and the financial loss to their owners was great. Recently the number of inspectors has been increased, until last summer there were fourteen in the province. But with more than six thousand apiaries, the provision though much improved, is still quite inadequate. The only satisfactory way is to make a thorough inspection of every hive in the province within a limited time, say, not more than three seasons. This would locate all the disease, and with sufficient means and a competent staff of inspectors, it could be pretty well stamped out. As in the case of other diseases of live stock, the Dominion Department of Agriculture should assist in this.

Besides the actual inspection, valuable work is being done by our inspectors in distributing a small bulletin on Foul Brood, issued by the Ontario Department of Agriculture. It describes the symptoms and treatment in such a way that anyone who will take the trouble can cure his own and his neighbor's bees. The bulletin is as follows:

FOUL BROOD—ITS DETECTION AND CURE.

This dread disease of the honey-bee is due to a bacteria known to scientists as *Bacillus alvei*. The larva or brood of the bees in its early stages is attacked by the foul brood germs, decomposes, decays and settles in a shapeless mass to the bottom and lower side of the cell. It becomes yellowish-brown in color at first, but later brown or coffee color, and gives off a very offensive odor. If pricked by a pin or tooth-pick, it will be found ropy, and will draw or string out a half inch or so. If the cell has been capped, the capping recedes and presents a sunken appearance. In time the matter dries down, and is of such a sticky, gluey nature that it adheres strongly to the bottom of the cell, thus leaving what we call the scale or stain mark of foul brood.

In looking for the disease, hold the frame or comb so that the light may shine into it. The stain marks may be seen by standing with your back to the sun and holding so that the light will shine on and into the lower side of the cell.

Other forms of dead brood, such as chilled, starved, pickled and poisoned brood, are different in character, and may be described as follows: The larva dies, but holds its form better; that is, it shrinks or dries from the outside, gives off very little odor and less offensive, does not adhere so tightly to the cell side, and may be removed by a pin or tooth-pick, and when pricked by them will not string out, but appears watery. These diseases will be removed by the bees themselves.

Not so with foul brood, however, for soon after the death of the larva it becomes so foul that the bees will not attempt to clean it out. The cell is apparently avoided, until it becomes dried down, and the odor has become less noticeable. The bees then accept it again, and after polishing it fill it with nectar. The moisture thus applied softens the scale or stain mark and releases the thousands of foul brood germs which float in the honey or nectar—waiting only until fed to larva, thus coming in contact with congenial matter, and causing its death, and their further development and multiplication. Thus it spreads; more and more cells become polluted, the colony dwindles and dies, leaving its honey a prey to robbers, who unsuspectingly carry it to their homes, and thereby transmit the disease, until an apiary will be soon destroyed and neighboring apiaries jeopardized.

Watch your brood; take an interest in it. Whenever you lift out a frame have a look at the larva. If it is healthy, fat and white looking, all is well. If not, apply the tests and find out what is the matter. If you discover the real thing, close the hive and mark it for treatment.

Method of Treatment.—To cure it we will follow the McEvoy method, getting rid of the combs and honey, for therein are the disease and germs. Go to the colony late in the evening, when the bees will not fly or scatter to other hives. Clip the queen and shake the bees off into the hive and give a set of frames with small foun-

dation starters. We have thus got rid of the combs as far as this colony is concerned. Not so with the honey. As soon as we disturb the colony, the bees load themselves with the diseased honey, and we must still get rid of that. They also clean up any honey that shook out during the manipulation on the floor of the hive, and any that remains on bar combs or was attached to the inside of the hives. This the bees would store if they had a particle of comb supplied ready. We have only given foundation starters, however, and they must work it out; wax secretion is necessary. Most of the honey is digested and used; but they soon have cells built and may store some of the diseased honey therein. To make a complete cure it is therefore necessary to again shake three days later, the same way as before, and supply full sheets of foundation.

Melt or burn up the old combs and the first set of starters, and the cure is complete if thoroughly carried out.

This cure can only be applied in the early part of the season and during a honey flow. If no flow is on the bees must be fed or they will swarm out and perhaps scatter into one or more hives, and thus make matters worse.

If the disease is discovered late in the season, and the colony is still strong, leave it until November, take the diseased combs away, and supply honey from a clean colony, in full sealed combs. *Be sure that the colony from which you take these sealed combs is itself free from disease.*

Saving of Brood.—Brood from badly diseased colonies is of no value and dangerous and should be melted, burned or otherwise destroyed at once. Brood from colonies having only a few cells diseased might be placed over an average colony only slightly diseased and the queen caged. When most of the brood has hatched, treat as given above.

Saving of Combs.—Combs free from pollen, that have never been used for brood rearing, that are white and clean, and have been dried from all honey before the colony was treated are reasonably safe for use as super combs. *As a rule, however, it would pay better to melt them into wax and use full sheets of foundation. All doubtful combs should be melted down.*

Empty hives, also, in which the bees have died or diseased combs have been stored or carried should be scalded or the inside burned over with a gasoline or oil torch.

AN ACT FOR THE SUPPRESSION OF FOUL BROOD AMONG BEES.

6 Edward VII., 1906.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. This Act may be known as "The Foul Brood Act."

2. The Lieutenant-Governor in Council upon the recommendation of the Minister of Agriculture may from time to time appoint one or more inspectors of Apiaries to enforce this Act, and the Inspector shall, if so required, produce the certificate of his appointment on entering upon any premises in the discharge of his duties. And the Minister shall instruct and control each Inspector in the carrying out of the provisions of this Act. The remuneration to be paid to any Inspector under this Act shall be determined by order of the Lieutenant-Governor in Council.

3. The Inspector shall, whenever so directed by the Minister of Agriculture, visit without unnecessary delay any locality in the Province of Ontario, and there examine any apiary or apiaries to which the said Minister may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and wherever the said Inspector is satisfied of the existence of foul brood in its virulent or malignant type, it shall be the duty of the Inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of the said inspector; but where the inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the Inspector has reason to believe that it may be entirely cured, then the Inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists. 53 V., c. 66, s. 3.

4. The Inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the Inspector may destroy, or order the destruction of, such box hives and the bees dwelling therein. 53 V., c. 66, s. 4.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies or infected appliances, shall on conviction thereof, before any Justice of the Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months. 53 V., c. 66, s. 5.

6. Any person whose bees have been destroyed or treated for foul brood, who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the Inspector so to do, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his bees, shall, on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month. 53 V., c. 66, s. 6.

7. Any owner or possessor of bees who refuses to allow the Inspector to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by the Inspector, may, on the complaint of the Inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and any subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the Inspector. 53 V., c. 66, s. 7.

8. Where an owner or possessor of bees disobeys the directions of the said Inspector, or offers resistance to, or obstructs the said Inspector, a Justice of the Peace may, upon the complaint of the said Inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the directions of the Inspector, proceed to the premises of such owner or possessor and assist the Inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said Inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act. 53 V., c. 66, s. 8.

9. Before proceeding against any person before a Justice of the Peace the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person. 53 V., c. 66, s. 9.

10. Every bee-keeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the Minister of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs. 53 V. c. 66, s. 10.

11. Each Inspector shall report to the Minister as to the inspection of any apiary in such form and manner as the Minister may direct, and all reports shall be filed in the Department of Agriculture, and shall be made public as the Minister may direct or upon order of the Legislative Assembly.

12. Chapter 283 of the Revised Statutes of Ontario, 1897, intituled "An Act for the Suppression of Foul Brood among Bees," is repealed.

Note.—Any bee-keeper suspecting that foul brood exists in his own or neighboring apiaries should at once notify the Director, Fruit Branch, Department of Agriculture, Toronto.

European Foul Brood.

Until the last two seasons the only species of Foul Brood known to exist in Ontario was that described in the last paragraph. But another kind of brood disease has made its appearance, and to distinguish the two, the new variety is named "European Foul Brood," and the more common kind is called "American Foul Brood."

European Foul Brood has destroyed the apiaries in great areas of different states in the Republic to the south of us. It is now known to be rampant in at least one section of Ontario. In one way it is much more to be dreaded than the American Foul Brood, because it runs its course and destroys an apiary much more rapidly, and because the adult bees will carry out the disease scales and scatter them in the yard and farther, to find their way into healthy colonies.

The symptoms are easily distinguished from American Foul Brood, as there is no ropiness, and the odor is different. Most of the larvæ die before they are sealed, and do not lose their form, but remain coiled in their natural position. The color in the earlier stages is lighter than in American Foul Brood. The odor is very pronounced and offensive, like decayed fish.

The McEvoy treatment is effectual if applied to the whole apiary at once, even though only a few colonies show the symptoms. Even then the cure is only permanent when the apiary is thoroughly Italianized.

Pickled Brood.

A disease slightly resembling Foul Brood has been designated as "Pickled Brood." The most positive difference in the diagnosis of this disease is the absence of ropiness and of the "glue pot" smell, which are always found in American Foul Brood. In Pickled Brood the larva decays from the inside leaving the skin tough and in its natural shape, in Foul Brood the skin of the larva softens as the contents become glutinous and all the natural wrinkles become smooth as the mass settles to the lower side of the cell. In Pickled Brood the larva often dries up so as to become loose in the cell and fall out when the comb is inverted. In American Foul Brood it always cements fast to lower cell wall so it cannot be removed without tearing the cell.

McEvoy asserts that Pickled Brood is caused by an insufficient feeding of the larvae, due to a sudden check of the honey flow, or a constitutional weakness of the workers. The latter he charges to in-breeding of the queens. Requeening with vigorous queens from other apiaries will often effect a cure, and it often disappears of its own accord.

The Library.

The nucleus has been formed of a Library of Bee Literature, which will have all the standard works on the subject. These are in process of collection and the leading articles are being indexed. It is proposed to continue the work of collecting and indexing until the Provincial Library of Apiculture is made most complete.

Such a library at the seat of Agricultural learning will be of inestimable value to the bee-keepers of the province.

A Model Apiary.

Another feature of great educational value to the province at large would be a model apiary in which the bees, hives, buildings, machinery and all appliances are of the greatest practical value. Students, and especially the visitors of the June excursions, would be able to study every detail of the equipment and go home to renovate the wasteful methods which now exist in so many farm apiaries.

Experimental Work.

This work which was conducted at the Horticultural Experiment Station, Jordan Harbor, was of necessity on a very small scale, as the bees and appliances had all to be bought and moved there, and the apiary building had to be erected. My time was also taken up with inspection and other work, so as to leave only two days per week with the experimental apiary. If this work is to be of any value it will be necessary to give it most of my time during the summer months.

A start was made, however, by finding out what had already been done at other Experiment Stations, so as to avoid needlessly going over ground which had been fully covered. For this purpose a circular letter was sent to all the Experiment Stations in Canada and the United States. Most of these report that they are doing nothing with bees. A few had done some work in past years, but had dropped it through pressure of other things. The only work of value that was reported to me as being done at the present time is in Tennessee, Maryland and Texas, and at United States Department of Agriculture, Washington, D.C. Dr. E. F. Phillips, Ph.D., in charge of that work, kindly sent me some valuable suggestions for experimental work.

I might say in a general way that experiments in the following lines were begun:

(*a*) To determine the influence of weather conditions on the working of bees and the nectar secretion of blossoms.

(*b*) To determine the amount of wax from foundation which is worked out by bees into the cell walls of the combs.

(*c*) To contrive some practical way of separating the wax and honey contained in cappings which have been removed from combs in the process of extracting honey.

(*d*) To test new inventions and report on their practical value for the benefit of bee-keepers.

(*e*) To test queens sold by commercial queen breeders.

Problems to be Worked Out.

The greatest problem which confronts the practical bee-keeper is that of controlling absolutely the mating of queen bees. This has so far baffled all scientists who have worked on it. Even Mendel, who did so much for the breeders by discovering the law of heredity, failed when he attempted this. Until it is solved very little progress can be made in developing and fixing desirable qualities in any strain of bees. I hope to take up this work. Other problems are, Wintering, Spring Management, and Swarm Control.

The experimental work must be, first of all, practical. As all practical work must be based on sound scientific principles, the underlying principles in the problems of bee-keeping must be established, and in order to do this a great deal of investigation must be carried on which does not immediately lead to practical results. Until we have our own laboratories, the bacteriological and chemical laboratories of the College will be of great value.

Co-operative Experiments.

Many of the experiments will yield more valuable results if conducted simultaneously in different parts of the province. To this end I would solicit the co-operation of the Experimental Union, many of whose members are doubtless engaged in bee-keeping.

Developing New Territory.

It is pretty well established that bees can be kept wherever man can live and cultivate the soil. At present there are vast areas of new territory in New On-

tario and the Western Provinces where honey-bearing flora is abundant, but no bees are kept. Some farmers in these places are anxious to keep bees because they see that honey is going to waste when they might be getting the good of it. Different students at the College have spoken to me about it. I think the establishment of experimental apiaries in New Ontario would be a valuable line of work to take up.

In fact there is so much educational and experimental work that can be done that it is simply a matter of choosing the work nearest at hand and reaching out for more as rapidly as possible.

MORLEY PETTIT.

PART XXII.

THE DEAN OF RESIDENCE.

To the President of the Agricultural College:

Sir,—I have the honor to submit my first report as Dean of Residence and Instructor in English, for the year 1909.

My duties commenced on July 1st and were at first limited to conducting repairs in and about the Residence, entertaining visitors, preparing lectures and generally making ready for the commencement of the term on Sept. 14th.

Affairs in the residence have preserved an entirely satisfactory character. The health of the students has been good, with the exception of a few trivial cases of cold, grippe, etc. A feature to which I should like to draw your attention is the keenness and enthusiasm shown in maintaining an amateur fire brigade. There are at present sixteen double hydrants in the grounds, in such positions as to render it possible to direct two streams of water upon any building within the College precincts. The students who form this volunteer fire brigade show great promptness and activity in their work, and from time to time I receive a report from the captains of reels, of which there are three, upon practice work. It is my opinion that everything should be done to encourage work of this sort, which is important both from the viewpoint of common safety and also from that of practical training. If I might suggest it, the installation of a system of communication between all buildings and the engine-room is not only desirable but necessary.

At present there are 215 students in residence and the accommodation is taxed to its fullest extent. The residence has been completely filled since the beginning of the term.

My work in English Composition, with the First Year, consists of lectures on the general principles of writing and rhetoric and the broader technique of the essay. Subjects are assigned for composition, and the productions of the students are corrected, noted, marked and handed back. With comparatively few lectures and with a class of such varied attainments, a detailed course of grammatical instruction is not possible. My object is to give the students only such broad and general rules as can be applied directly to their own necessary writing, the taking of notes, condensing of chapters, etc. The English Literature Class (Third Year) has been a remarkably good one. Since the commencement of the term we have read the "Twelfth Night," of Shakespeare, and studied the play critically, taken up the dramatic development of Shakespeare, and also had time for a series of lectures on "The Origin of the Drama in England, and its Development up to the Elizabethan Period." This class has been one of the most attractive phases of my work.

In conclusion I can gratefully assert that I have had the help and support of all connected with the residence, a fact I most heartily appreciate.

Yours respectfully,

G. H. UNWIN.

PART XXIII.

THE LIBRARIAN.

To the President of the Ontario Agricultural College:

SIR,—I have the honour to submit herewith the report of the Library for the year 1909.

During the past year 1,104 volumes have been added to the Library and these are classified as follows:

Agricultural reports	94	History	13
Agriculture	69	Horticultural reports	19
Bacteriology	36	Horticulture	31
Bees	2	Hygiene	39
Biography	37	Literature	129
Botany	30	Manual training	8
Chemistry	101	Nature study	7
Dairy	7	Ornithology	3
Description and travel	16	Physics	6
Domestic animals	46	Poultry	6
Domestic science	44	Psychology	4
Drawing and decoration	21	Reference books and general magazines	33
Economics	53	Science	29
Education	34	Science reports	22
Engineering and electricity	6	Useful arts	1
Entomology	13	Zoology	4
Ethics and religion	49	General reports	6
Fiction	37		
Fine arts	15		
Forestry	30		1,104
Geology	4		

The following sets of books have been added to the Reference Shelves:

Dictionary of National Biography	22	vol.
Analyst (a chemical periodical)	32	"
Standard Library of Natural History	5	"
Seton, Ernest Thompson, Life Histories of Northern Animals	2	"
Green, Richard, Short Story of the English People, illus. ed.	4	"

We wish to take this opportunity of expressing our appreciation of all our exchanges, especially of those of the United States Department of Agriculture and of the Experiment Stations of America, Australia, Cape Colony, England, Europe, India, Japan and South America.

Two new exchanges have been sent to us, for which we are very grateful: Bee-keepers' Review, Flint, Michigan; Practical Dairyman, Rutherford, N.J.

One of the visitors with the National Women's Congress in June, Miss A. M. Machar, has also kindly sent us a copy of her novel, "Roland Graeme, Knight."

The binding of periodicals has amounted to the same as last year's, 170 volumes having been done. Of the loose and worn books, 91 volumes have been rebound, besides those which needed mending only.

The circulation of books for home use has been 5,325 volumes during the year. From April 19th to June 30th, while the Normal Class was at the College the circulation amounted to 858 volumes. Of these 336 volumes were to regular

students of the College and Macdonald Institute, leaving 522 volumes taken by the Normal students. The fiction amounted to 363 volumes out of this number, and science and agricultural books to but 159. This does not include, however, the Manual Training books kept in that department, or the Agricultural and Nature Study books in the Nature Study Office, which could be read there.

During the past year 1,284 books have been recatalogued, covering the classes of bacteriology, physiology, literature and fiction. This brings the number of volumes classified and catalogued, according to subject, to about 7,400 volumes. The number of volumes in the Library is 19,410.

I have the honor to be, Sir,

Your obedient servant,

EDITH C. DWIGHT.

PART XXIV.

THE PHYSICIAN.

To the President of the Ontario Agricultural College:

SIR,—As requested in your letter of recent date, I present to you my report for the current year.

I shall not give the details of the many minor ailments and injuries occurring in Macdonald Hall and in the College during the winter months. They were such as we usually have in these institutions and in this community. You will recollect, however, that one of the students of the First Year was seriously ill from empyema just at the close of his term, and that he entered St. Joseph's Hospital, where he was obliged to undergo an operation and to remain for several weeks before he was sufficiently recovered to return to his home. I am glad to state that my latest news from him is quite encouraging, though his further studies in the College have been indefinitely postponed. I have also to report a case of typhoid fever in one of the young ladies in Macdonald Hall just after the Easter vacation. She entered the General Hospital, where, after an illness of several weeks, she made a good recovery. It will be a satisfaction to you to know that infection was not received during her residence in the Hall.

In September of this year the College and Institute opened with the largest attendance on record, and thus far the health of the students in both places has been very satisfactory. Football injuries have been, however, rather more numerous than usual. Fracture in the forearm occurred in one game, fracture of the clavicle in another, and a serious injury to the elbow joint in a third, besides several injuries of less gravity.

I am glad to hear of the prospect of increased residential accommodation, which I am sure will add to the comfort of the many students seeking admission.

Respectfully submitted,

W. O. STEWART.

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REPORT

OF THE

Ontario Veterinary College

1909

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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1910.

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TORONTO

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of Your Honour the Report of the Ontario Veterinary College, for the year 1909.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

TORONTO 1910.

Students of the first year class 1909-1910 and Members of the Faculty.

COLLEGE STAFF AND SUBJECTS TAUGHT.

E. A. A. Grange, V.S., M.S.,
Contagious Diseases of Animals and Veterinary Hygiene.

T. G. Brodie, M.D., F.R.S.,
Physiology.

C. Heath Sweetapple, V.S.,
Librarian and Curator of the Museum.

W. J. R. Fowler, V.S.,
Anatomy, Obstetrics and Sporadic Diseases of Cattle.

J. A. Amyot, M.B.,
Bacteriology.

H. G. Reed, V.S.,
Sporadic Diseases of the Horse and Veterinary Materia Medica.

D. King Smith, M.B., V.S.,
Pathology and Histology.

M. D. McKichan, B.A., M.D.,
Zoology and Demonstrator.

Paul L. Scott, M.B.,
Pharmacy.

C. G. Saunders, V.S., B.V.Sc.,
Canine and Feline Diseases.

H. E. Hurd, V.S.,
Dairy Inspection.

Dyce W. Saunders, K.C.,
Veterinary Jurisprudence.

F. B. Kenrick, B.A., Ph.B.,
Chemistry.

J. Horace Faull, B.A., Ph.D.,
Botany.

R. E. Murray, V.S.,
Meat Inspection.

R. W. Wade, B.S.A.,
Breeds and Breeding, Foods and Feeding.

T. C. Evans, V.S.,
Demonstrator.

H. G. Wilson, B.A., M.B.,
Demonstrator.

L. T. Addison, B.A., M.D.,
Demonstrator.

S. A. Cudmore, B.A. (Oxon.),
Tutorial Instructor.

Andrew Smith, F.R.C.V.S., D.V. Sc.,
Professor Emeritus.

Jas. E. Anderson,
Executive Clerk.

A section of the first year class at work in laboratory Zoology. Session 1909-1910.

ONTARIO VETERINARY COLLEGE.

To the Honorable Minister of Agriculture:

SIR,—I have the honor to submit the following report of the Ontario Veterinary College from the first day of January, 1909, up to the end of October of the same year.

During the first three months of the year class-room instruction was conducted in a manner similar to that of the autumn term of 1908, which was described in my report for that year.

In the latter part of the spring term of 1909 our senior students were materially benefited by receiving a practical course in meat inspection, which was made possible through the kindness of the Directors of three large abattoirs of this city, viz.: The Wm. Davies Co., Limited; The Harris Abattoir Co., Limited; and The Park Blackwell Co., Limited. These companies permitted our students to witness the killing operations and inspection work as conducted in their establishments by the Meat Inspectors of the Dominion. The growing demand for Veterinary inspection of meat products has caused this branch of our curriculum to become one of increased importance.

In planning the practical work of meat inspection, I desire to express my appreciation for valuable aid rendered by Veterinary Director-General Rutherford, and the interest manifested by his Inspectors in showing our students how to conduct the work in an expert and practical manner while under their supervision at the various abattoirs.

Our senior students were also materially benefited by a visit to the Ontario Agricultural College at Guelph where they saw many things that rest on the border lines of Veterinary Science and Agriculture and to which their attention was drawn and explanations made by the Professors in charge. The pains which were taken by President Creelman and faculty of the O.A.C. to make the visit an educational success is highly appreciated and the benefit our students derived from it is hard to estimate.

RESULTS OF SPRING EXAMINATIONS 1909.

At the close of the spring term examinations were held in all subjects taught here, the following are the results:

FIRST YEAR.

Subjects: Theory and Practice, Anatomy, Animal Parasites, Dentistry, Horseshoeing, Zoology, Minor Surgery, Chemistry, Botany.

The following students passed:

Adams, F. J.
Aikenhead, J. P.
Allen, L. J.
Barker, W. E.
Belding, W. A.
Bennett, J. E.
Berger, R. L.
Bird, C. E. H.
Blackwood, A. C.
Boast, R. D.
Bowen, L. E.
Bratton, R. L.
Bright, S.
Brooks, J. M.
Cain, S.
Canty, J. M.
Casler, H. D.
Cober, A.
Collet, H. B.
Connor, J. E.
Cooke, E. H.
Cornell, A.
Davisson, H. L.
Durrand, D.
Dunkelberger, D. W.
Eason, W.
Edwards, J.
Failor, H. F.
Fowler, J. A.
Gruber, J.
Harris, J. C.
Hawke, W. L.
Hearns, E. B.
Holmes, N. J.
Howden, W. J.
Irwin, E. E.
Irwin, I. B.
Jaques, S.
Joyce, E. J.
Kee, R.
Keleher, J. J.
Kelly, R.
Kennedy, B. D.
Langdon, H. B.
Lawler, W. J.
Lueking, E. O.
McBride, J.
MacIntosh, R. D.
McNabb, F. R.
Maynard, E. R.
Maze, L. A.
Miller, E. C.
Milner, R. J.
Mills, H. L.
Milton, M. H.
Nelson, C. L.
Noonan, J. E.
O'Hara, S. L.
Ottewell, C. F.
Paquette, G.
Parker, C. E.
Pearen, J. P. A.
Preston, M. J.
Price, W. B.
Purcell, J T.
Richmond, A. R. B.
Rowles, W.
Royer, D. R.
Rozine, W. H.
Schofield, W. L.
Simmons, A. W.
Smith, W. A.
Sparks, H. D.
Stevenson, W. L.
Tanner, A. C.
Thompson, W. A.
Tupling, G.
Upright, J. W.
Walker, E. P.
Wallace, B.
Welsh, T. H.
Whitehead, G.
Warner, R. J.
Wood, W. J.
Woodard, J. A.
Weaver, C. H.

In addition to the above twenty-two students failed to pass in one or more subjects, they will be given supplementary examinations, and required to pass before the degree of the College will be given them.

Second Year.

Subjects: Anatomy, Diseases and Treatment, Veterinary Surgery, Physiology, Pathology, Materia Medica, Veterinary Obstetrics, Contagious Diseases, Cattle Diseases, Practical Histology, Bacteriology.

The following students passed:

Baker, E. A.
Beall, W.
Bitgood, E. M.
Black, W. G.
Blyth, R.
Byrd, E. H.
Cass, H. L.
Christie, N. D.
Cockerton, G. C.
Cole, A. B.
Cole, G. P.
Currie, J. M.
Dixon, H. L.
Elliott, E. W.
Flanary, W. F.
Ford, J. A.
Foster, E. E.
Frame, A. S.
French, C. F.
Garrett, H. H.
Hackett, J. F.
Hall, O.
Hammerberg, C. E.
Hancock, J. R.
Harvey, J. G.
Heron, F. V.
Holmes, H. N.
Jagger, T. H.
James, N. C.
Kelleher, A. J.
Kelly, G.
Korinek, A. W.
Korinek, G. F.
Kyddson, R. J.
Lumsden, R. E.
McCord, F. A.
McCullough, H.
McDermont, G. F.
McDermott, J. J.
McIntyre, J. A.
McKee, J. C.
McLean, A. T.
Martin, G. R.
Miller, F. B.
Monroe, A. R.
Moynahan, J. J.
Moynihan, W.
Nichols, W. S.
O'Brien, G. J.
Pokrandt, O. A.
Robins, W. A.
Rutherford, F. W.
Schofield, F. W.
Schuey, G. B.
Selmser, F.
Shoffstall, A. C.
Smead, M. J.
Sprunk, G. R.
Wallace, C. L.
Walsh, J. A.
Wilson, R. G.
Wyatt, C. N.

Students of the first year class assembled for work in the Chemical laboratory. Session 1909-1910.

In addition to the above nineteen students failed to pass in one or more subjects, they will be given supplemental examinations, and required to pass before the degree of the College will be given them.

The following post-graduates of the two year course were granted the new diploma of the College after attending the third year course and successfully passing the final examinations:

Appleby, John Hy., Vancouver, B.C.
Bitler, Sherman E., Turbotville, Pa.
Case, E. G., Cortland, N.Y.
Cash, G. B., Alexandria, Ohio.
Chambers, P. A., Ormstown, Que.
Coombes, F. M., Brandon, Man.
Coxe, S. J., Brandon, Man.
Curry, Basil G. E., Gettysburg, Pa.
Gibson, J. B., North Vancouver, B.C.
Hilgeneck, E. H., Elmore, Ohio.
Hodgson, R. K., Toronto, Ont.
James, Norman V., Gladstone, Man.
MacMillan, Donald, Magog, Que.
Martin, S. T., Winnipeg, Man.
Nugent, T. F., Rockport, Mass.
Shively, W. G., Knox, Pa.
Wood, Geo. D., Hartland, Vt.

Owing to last year being the first of three year course it was not possible to have a third year class in the regular way but one was formed for the benefit of former students who desired a third term and as a consequence the class was smaller than usual.

The following graduates of the Ontario Veterinary College of the Class of 1909 were granted the degree of Bachelor of Veterinary Science by the University of Toronto, after passing the examinations rquired by that institution:

Appleby, John Henry.
Cash, George Buchanan.
Chambers, Preston Alexander.
Coombes, Frederick Middleton.
Gibson, John Bernard.
Hodgson, Robert Kerr.
James, Norman Valentine.
Martin, Stanley Thomas.
Nugent, Thomas Francis.
Saunders, Charles Greatley (1909).

Smith Scholarships.

The Scholarship for the First Year was won by W. L. Hawke, of Medicine Hat, Alberta.

The Scholarship for the Second Year was won by F. W. Schofield, London, England.

Students in Attendance in 1909.

Adams, F. J.
Aikenhead, J. P.
Alexander, W. H.
Allen, L. J.
Andrews, J. R.
Atkinson, T. E. F.

Babcock, W. H.
Baker, E. A.
*Balfour, N. H.
Baldwin, C. S.
Ballard, W. G.
Balliet, H. J.
Banks, V.
Barker, W. E.
Beall, W.
Beaudette, J.
Belding, W. A.
Bennett, J. E.
Berger, R. L.
Bescoby, B. A.
Biddle, G.
Bird, C. E. H.
Bitgood, E. M.
Black, W. G.
Blackwood, A. C.
Blyth, R.
Boast, R. D.
Booker, F. D.
Bourrsox, J. F. D.
Bowen, L. E.
Bratton, R. L.
Bright, S.
Brooks, J. M.
Brunet, O.
Brown, J. N.
Brown, O. O.
Brydon, A. B.
Burtt, G. J.
Burt, A.
Byrd, E. H.

Cain, S.
Caley, D. R.
Cameron, W. R.
Campbell, D. J.
Campbell, T.
Canty, J. M.
Carley, A. A.
Carolan, J. L.
Cash, G. B.
Casler, H. D.
Cass, H. L.
Chipman, G. R.
Christie, N. D.
Clair, J. F.
Cober, A.

A section of the first year class in the Botanical laboratory. Session 1909-1910.

Cockerton, G. C.
Coffin, J. M.
Cole, A. B.
Cole, G. P.
Colebourn, H.
Collett, H. B.
Connor, J. E.
Conway, L. E.
Cooke, E. H.
Cooley, L. S.
Coon, W. B.
Corken, P. R.
Cornell, A.
Cowan, H. W.
Croken, I. E.
Currie, J. M.

Dann, J. H.
Davis, C. F.
Davisson, H. L.
Dellert, R. B.
Dixon, H. L.
Doll, T. B.
Duchesnay, W.
Duclos, F. N.
Dunbar, R. R.
Duncan, W.
Dunkelberger, J. W.
Durrand, D.

Eason, W.
Ebright, N.
Eckert, H. A.
Edwards, J.
Elliott, E. W.
Elliott, S.
Estes, H.

Failor, H. F.
Flanary, W. F.
Ford, J. A.
Foster, E. E.
Fowler, J. A.
Frame, A. S.
Fraser, J. H.
French, C. F.

Garrett, H. H.
Grace, W. E.
Gray, R. G.
Greenwood, L. G.
Gruber, J.

Hackett, J. F.
Hafey, J. M.
Hall, O.
Halsey, A. B.
Hammerberg, C. E.
Hancock, J. R.
Hanmore, G. S.
Harrington, J.
Harris, J. C.
Harris, W. S.
Harrison, W. J.
Harvey, J. G.
Haskins, W.
Hawke, W. L.
Haynes, J. A.
Hearns, E. B.
Hennan, J. H.
Henry, F.
Heron, F. V.
Hodam, W. F.
Holmes, H. N.
Holmes, N. J.
Howe, E. E.
Hall, R. G.
Howden, W. J.
Hudgins, P. H.
Humphrey, F. M.
Hurd, C. L.

Irwin, E. E.
Irwin, I. B.

Jagger, T. H.
Jahn, W. J.
James, A. T.
James, N. C.
James, R.
Jardine, E. F.
Jaques, S.
Jerry, H.
Jervis, J. G.
Jones, W.
Joslin, E. M.
Joyce, E. J.
Judd, A. W.

Kee, R.
Keefe, J. M.
Kelleher, A. J.
Keleher, J. J.
Kelly, G.
Kelly, R.
Kemp, D. T.
Kennedy, B. D.
Kennedy M. P.
Keressy, D. R.
Keyes, B.
Killips, H.
Kinney, G. G.
Kirby, A. G.
Knight, G. E.
Korinek, A. W.
Korinek, G. F.
Kyddson, R. J.

Langdon, H. B.
Langford, S. M.
Lawler, W. J.
Long, R. E.
Lounsbury, O. E.
Lueking, E. O.
Lumsden, R. E.
Lundie, A. C.
Lynch, D. J.
Lyon, L. M.

MacBride, J.
MacDougall, W. F.
MacIsaac, D. A.
MacIntosh, R. D.
Markham, H. V. O.
Martin, G. R.
Martin, J. A.
Maxwell, H. S.
Maynard, E. R.
Maze, L. A.
Mills, H. L.
Miller, E. C.
Miller, F. B.
Miller, P. A.
Milner, R. J.
Milton, M. H.
Monk, C. W.
Monroe, A. R.
Mosher, J.
Moynahan, J. J.
Moynihan, W.
Murphy, H.
Myers, F.
McChesney, D. H.
McCord, F. A.
McCoy, G. C.
McCullough, H.
McDowell J. J.
McDermont, G. F.
McDermott, J. J.
McEwan, N. E.
McGuire, J. B.
McIntosh, G. W.
McIntyre, A. T.
McIntyre, J. A.
McIntyre, G. D.
McKee, J. C.
McLean, A. T.
McManus, J. H.
McMaster, J. D.
McNabb, F. R.

Nelson, C. L.
Nelson, H. D.
Nichols, W. S.
Noonan, J. E.
Norbeck, G. O.

O'Brien, J. H.
O'Brien, G. J.
O'Gogarty, M. G.
O'Hara, S. L.
Ottewell, C. F.

Page, F. R.
Parker, C. E.
Parkhurst, R. N.
Paquette, G. H.
Parsons, W. M.
Pearen, J. P. A.
Penrod, W. A.
Pfarr, A. W.
Pilkey, M.
Pinkerton, D. H.
Planas, T. S.
Pokrandt, O. A.
Pollock, L. E.
Potter, G. G.
Preston, M. J.
Price, W. B.
Purcell, J. T.

Richmond, A. R. B.
Robertson, D. M.
Robins, W. A.
Robinson, E. D.
Rolfe, J. L.
Rosenberger, R. W.
Rowles, W.
Royer, D. R.
Rozine, W. H.
Rutherford, F. W.
Ryan, C. L.

A section of the second year class assembled for work in the dissecting room. Session 1909-1910.

St. Clair, L. B.
Saunderson, W. H. C.
Schaaf, C. M
Schofield, F. W.
Scofield, W. L.
Schlosser, F.
Schuey, G. B.
Selmser, F.
Shaw, R. A.
Shofstall, A. C.
Simmons, A. W.
Simpson, J.
Sipfle, G. C.
Sissons, A. T.
Skelton, R. T.
Smead, M. J.
Smith, H. W.
Smith, W. A.
Sparks, H. D.
Sparrow, M.
Sprunk, G. F.
Stetson, H. C.
Stevens, W. W.
Stevenson, W. L.
Stirk, S. D.
Stinchcombe, W. A.
Strong, E. L.
Stroh, V. E.
Swenson, S. R.

Tanner, A. C.
Thompson, W. A.
Timmis, R. S.
Truman, A. J.
Tupling, G.

Upright, J. W.

Vanderhoof, W. M.
Van Vranken, E. W.
Vickers, R. F.

Waind, G.
Walker, E. P.
Walker, J. E.
Wallace, B. M.
Wallace, C. L.
Walsh, J. A.
Warner, E. S.
Warner, R. J.
Watson, R. P.
Way, A.
Weaver, C. H.
Welsh, T. H.
Whitehead, G.
Wilson, R. G.
Witty, C. W.
Wood, W. I.
Woodard, J. A.
Wright, S. B.
Wyatt, C. N.

Young, W. B. M.

Zell, W. C.

*Deceased.

Total number, 312.

During the period between the spring and fall sessions of the College much time was spent in preparing for the incoming classes, and an effort was made also to increase the educational advantages of the extended or three year course by equipping the College for teaching various subjects so as to accord with the latest and most approved methods adopted by progressive institutions of learning.

In order to carry out the foregoing it was necessary to introduce the laboratory method of practical teaching; this has been done and in a manner which I think indicates that wholesome progress has been made.

The following is an outline of some of the most salient features adopted in teaching our subjects: The science of Bacteriology has proven of such vast importance to the Veterinary Student in studying the causes, symptoms and treatment of disease, as well as in the treatment of wounds caused through surgical operation or otherwise, that to do it anything like justice as an educational factor in our course it was necessary to have a good laboratory. This has just been installed.

In conducting the work of this laboratory, and to save that which appeared to be unnecessary expense, the senior class was divided into two sections. A suitable room and equipment for 50 students is in operation and arrangements made whereby every student will receive say 90 hours of practical work in studying various organisms which cause injury or disease. The principal articles which were obtained for the equipment of this laboratory included microscopes, incubators, sterilizers, ice chambers, chemicals, and numerous smaller articles which are necessary for thorough work in an up-to-date manner. An advantage in having this laboratory equipped on the plan which has been adopted is that we are enabled to use many of the higher priced articles in teaching and conducting laboratory work in other sciences, such as Histology, Zoology, Embryology and Pathology, as well as practical Pharmacy; all of which are conducted in the same room.

The addition of the aforesaid laboratories to our course, even at this early date, has had a very wholesome influence on our students in awakening a keener interest for study in the various branches of our curriculum.

The above improvements have been confined to the College Building on Temperance Street, but other improvements have been made at our quarters on Rich-

Students studying diseased tissues in the Museum of the College. Session 1909-1910.

mond Street, where our dissecting room has been renovated and generally improved for the purpose it is intended.

Beneath the dissecting room, and on the ground floor of the same building, a most important and useful addition has been made in the construction of an amphitheatre which serves our purpose for giving instruction in practical Surgery; for demonstrating various operations in Equine Dentistry; for instruction in the practical application of various kinds of horse shoes to be used in health and disease; and for the practical and comparative work in judging horses as well as kindred subjects.

Turning briefly to those branches of our College course which are taught and demonstrated in the laboratories of the University of Toronto, viz.: Physiology, which is taught through a course of 60 lectures and demonstrations including such important subjects as the blood and phenomena of clothing; the circulatory mechanism of the heart and blood vessels; physiology of digestion and absorption of foods; chemical character of different foods; digestive secretions; digestion in different parts of the alimentary tract; respiration and mechanism of the organs concerned; the physiology of ductless glands; neuro-muscular mechanism; the central nervous system; the production of heat in the body and the regulation of body temperature; the central nervous system and functions of the chief parts of the brain; the physiology of the special senses; the physiology of the kidney and other excretory organs.

In Botany the course consists of 30 hours' laboratory and lecture work. The plant as a whole is studied and the structure and functions of its different parts. Then the great groups of plants are taken up by type forms, food and poisonous plants being given especial attention.

Chemistry is taught by lectures and practical work; the latter is conducted in a well-equipped laboratory.

Returning to the College buildings on Temperance Street, where most of our work is done, we have courses conducted in the following subjects, and in the manner indicated as follows:

Contagious Diseases of Animals.—Is taught by lectures illustrated with diagrams, diseased tissues, and when possible, with infected animals.

Veterinary Hygiene.—Taught by lectures, illustrated with materials used in promoting health.

Sporadic Diseases of Animals.—Embracing the various diseases which are not regarded as contagious. Their causes, symptoms and treatment are thoroughly described in lectures illustrated with numerous specimens now in the Museum of the College, also with affected animals as they occur from time to time in practice.

Veterinary Anatomy.—Is taught first in the class room, and the applied science by a full course of dissection in the dissecting room near the main building of the College.

Veterinary Surgery.—Is taught first in the class-room by illustrated lectures, and the applied science or practical work of the course is freely demonstrated in the new Amphitheatre. Veterinary Materia Medica embraces a description of the most important drugs and agents used in the cure of disease or the alleviation of pain, including their actions, uses, and doses for the various domestic animals.

Veterinary Pathology.—The course in this subject will extend over two years and will include a series of lectures and laboratory demonstrations, both macroscopic and microscopic.

The lectures are divided so that general Pathology is taken up the first year, and the following year is devoted to special Pathology: Gangrene; degeneration;

A section of the third year class assembled for work in the Bacteriological laboratory. Session 1909-1910.

infiltrations; inflammation; tumours; cysts; hypertrophy; atrophy and bone diseases, are some of the subjects which are discussed in this course.

Veterinary Histology.—Is taught by illustrated class-room lectures, all of which are demonstrated in a spacious room for the purpose, and the student is shown how to prepare, mount, stain and examine with the aid of a microscope various tissues in health and disease.

Veterinary Obstetrics.—Is taught by a course of lectures, illustrated with large diagrams and numerous instruments used in the practice of this most important art.

Post Mortem Demonstrations.—Are conducted by autopsies on the subjects procured for the purpose, in the amphitheatre of the College.

Pharmacy.—Is taught by a course of lectures and practical work conducted in the laboratory.

Bacteriology.—This branch of the College course will receive full consideration through numerous lectures in which special attention will be given to technique in preparing and studying certain micro-organisms or germs, especially those which are believed to cause disease. The study of toxins, and the preparation of antitoxins, vaccines, and other biological products will be extensively discussed. The practical work of this science is conducted at much length in the laboratory previously mentioned.

Zoology.—Is taught by illustrated class-room lectures, and dissections in the laboratory.

Entozoa and Ectozoa are taught in the class-room and the practical features of the subject illustrated by specimens, microscopic preparations and drawings, in the laboratory.

Veterinary Dentistry.—This branch of our course will be conducted through illustrated lectures in the class-room, and the practical education of the student in the art is demonstrated in the amphitheatre.

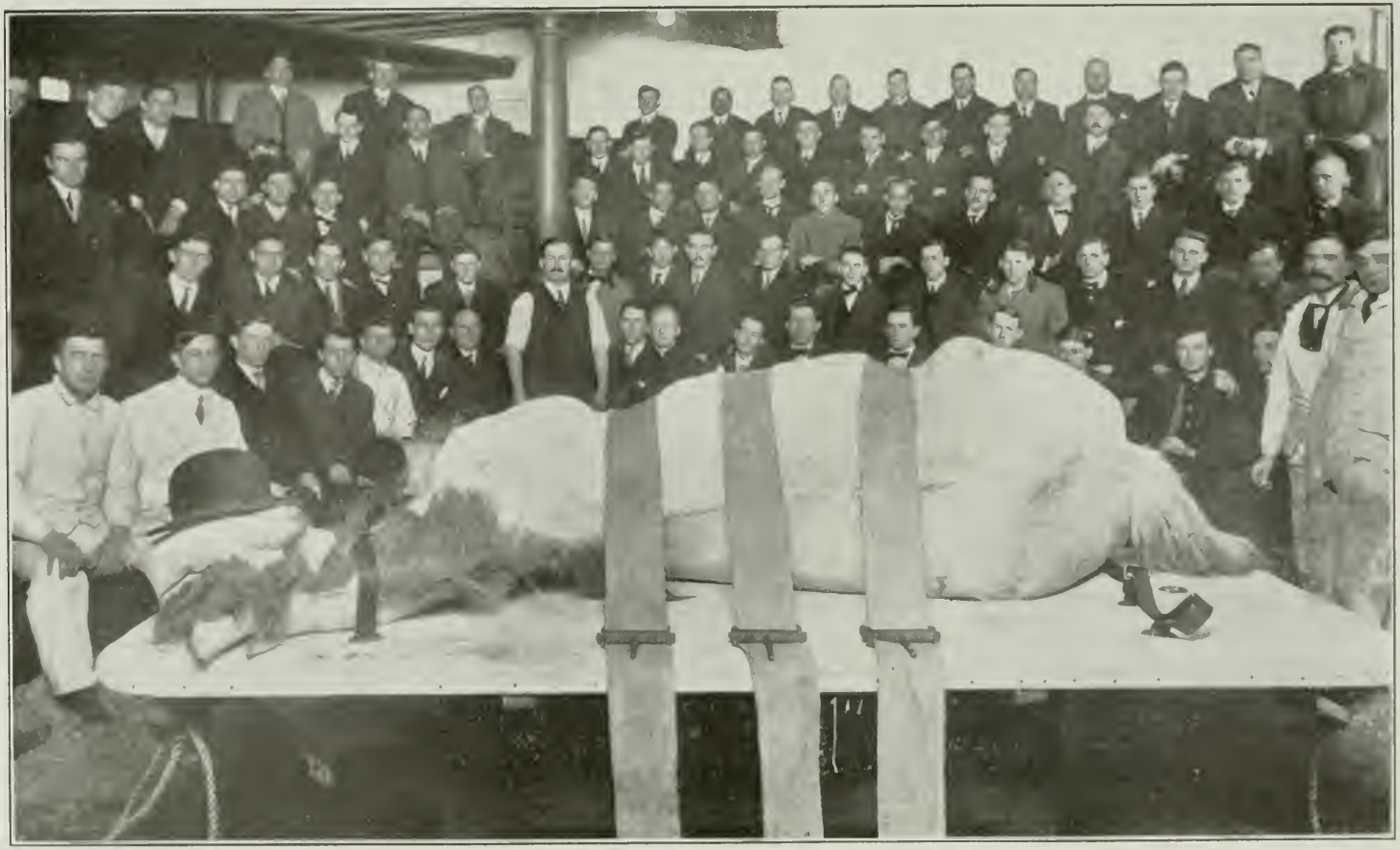
Breeds and Breeding of Domestic Animals.—Is taught by lectures in the class-room, living animals in the amphitheatre of the College, where external conformation and examination for soundings will be discussed as well as stock judging with animals before the class.

Meat Inspection.—Is taught both in the class-room of the College and abattoirs of the city in a manner which will accord with the laws and regulations of Veterinary Sanitary Science throughout the Dominion.

Arrangements have been made whereby a course of lectures will be given in Veterinary Jurisprudence, including a number of subjects which are important to the Veterinary Surgeon, such as contracts relating to the purchase and sale of live stock, unsoundness and vice in horses or other animals, the straying and impounding of cattle, laws relating to transportation of live stock, laws relating to the spread of malignant diseases, laws relating to diseased meats, laws of the road, the law of warranty and kindred subjects.

Arrangements have also been made for a course in Dairy Inspection which will include lectures in the construction of the dairy barn and milk house; the care of utensils; the handling of milk from the time it is drawn from the cow until it is placed upon the market for sale. Dairy cattle in health and disease, especially those which are communicable to the human family through milk, and various other matters relating to dairy inspection.

In addition to our regular professional course a tutorial class has been instituted for this year. It is designed to prepare students for matriculation at the



Students of the third year class attending a surgical clinic in the amphitheatre with a subject on the table secured for operation. Session 1909-1910.

University of Toronto in order that they may be granted the Veterinary degrees of that institution, providing their various examinations bring them up to a required standing.

In organizing the educational work of this college the session has been divided into two terms, one extending from the 1st of October to say the middle of January and known as the fall term, the second or spring term lasting from the close of the fall term till the middle of April.

Reference to the programme and time cards (pages 26 to 29) will at once show the work which is required by our course; the number of hours which are devoted to each study; and the time of day at which it is given.

Financial Statement.

For the ten months ending Oct. 31, 1909.

Revenue.

Fees	$17,866 00
Breakages and Fines	46 00
Rent of Office	101 00
Additional fees received and transmitted to Provincial Treasurer, subsequent to the closing of Books for ten months ending October 31st, and to be credited in Public Accounts for year beginning November 1, 1909	699 00
	$18,712 00

Expenditure.

Salaries and Wages	$10,939 96
Rent, Fuel, Light, Water, etc.	4,933 13
Furnishings, Repairs, and Contingencies	3,427 74
Total Expenditure	$19,300 83
Less Revenue	18,712 00
Net Expenditure	$588 83

One of the lecture rooms of the College. 1909-1910.

PROGRAMME AND TIME TABLE.

FALL TERM—SESSION 1909-1910.

First Year.		Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8–9	a.m.	Tutorial Class. Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."
9–10	"	Anatomy Room "C."	Theory and Practice Room "C."	Chemistry	Chemistry	Anatomy Room "C."	Anatomy Room "C."
10–11	"	Biology Room "C."	Chemical Pathology Room "C."	Chemistry	Chemistry	Biology Room "C."	Materia Medica Room "C."
11–12	"	Equine Dentistry Room "C." Section "B."	Biology Room "C." Section "A."	Chemistry	Chemistry Section "B."	Pharmacy Room "C." Section "A."	.....
1–4	p.m.	Laboratory Biology Room "A.	Laboratory Biology Room "A."	.....	Laboratory Biology Room "A."	Laboratory Biology Room "A."	.....
1.30–3.30	"	..... Section "A."	.....	Amphitheatre Clinic	.....	..... Section "B"	.....
2–5	"	Botany at University	.....	.....	.....	Botany at University	.....
4–5	"	.....	.....	Pharmacy Room "C."	.....	.....	.....
Second Year.							
8–9	a.m.	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."
9–10	"	Pathology Room "B."	Anatomy Room "B."	Pathology Room "B."	Physiology at University	Pathology Room "B."	Physiology at University.
10.30–11.30	"	.....	.....	.....	.....	.....	Anatomy Room "B."
10–11	"	Anatomy Room "B."	Disase and Treatment "Room B."	Materia Medica Room "B."	Regional Anatomy and Surgery Room "B."	Disease & Treatment Room "B."	.....
11–12	"	Contagious Diseases Room "B."	Cattle Diseases "Room B."	Contagious Diseases Room "B."	Bacteriology Room "B."	.....	.....
1–3	p.m.	Dissection	.....	.....	.....	.....	.....
1–5	"	.....	Dissection	Dissection	Clinic	Dissection	Dissection
3–4	"	Materia Medica	.....	.....	.....	.....	.....
5–6	"	.....	Physiology at University	.....	.....	.....	.....

PROGRAMME AND TIME TABLE.—*Continued.*

FALL TERM.—SESSION 1909-1910.

Third Year.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8–9 a.m.	Tutorial Class Room "D."	Tutorial Class Room "D,"	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."	Tutorial Class Room "D."
9–10 "	Pathology Room "B."	Anatomy Room "B."	Pathology Room "B."	Equine Dentistry Room "B."	Pathology Room "B."	Canine and Feline Diseases Room "B."
10.30–11.30 a.m.	.....	.....	.....	.....	.....	Anatomy Room "B."
10–11 "	Anatomy Room "B."	Disease & Treatment Room "B."	Materia Medica Room "B."	Regional Anatomy & Surgery Room "B."	Disease & Treatment Room "B."	.....
11–12 "	Contagious Diseases Room "B."	Cattle Diseases Room "B."	Contagious Diseases Room "B."	Bacteriology Room "B"	Bacteriology Room "B."	.....
1–3 p.m.	Dissection	.....	.....	.....	.....	.....
1–4 "	.....	Clinic	Dissection	Dissection	Dissection	Dissection
3–4 "	Materia Medica	.....	.....	.....	.....	.....
4–6 "	Laboratory Bacteriology	Laboratory Bacteriology	.....	Laboratory Bacteriology	Laboratory Bacteriology	.....
4.30–6 "	.....	.....	Tutorial Class Room "D."	.....	.....	.....

Subject to change.

PROGRAMME AND TIME TABLE.—*Continued.*

SPRING TERM.—SESSION 1909-1910.

First Year.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8–9 a.m.	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class
9–10 "	Anatomy Room " C."	Theory and Practice Room " C."	Chemistry	Chemistry	Anatomy Room " C."	Anatomy Room " C."
10–11 "	Biology Room " C."	Clinical Pathology Room " C."	Chemistry	Chemistry	Biology Room " C."	Materia Medica Room " C."
11–12 "	Equine Dentistry or Horse Shoeing Room " C."	Biology Room " C."	Chemistry	Chemistry	Pharmacy Room " C."	.....
1–4 p.m.	Dissection	Dissection	Dissection	Dissection	Dissection	Dissection
4–6 "	.....	.....	Laboratory Pharma'y Room " C." Section " A." 6 weeks Section " B." 6 weeks	.....	Amphitheatre Clinic	.....
Second Year						
8–9 a.m	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class	Tutorial Class
9–10 "	Parasitology Room " D."	Anatomy Room " B."	Parasitology Room " D."	Physiology at University	Parasitology Room " D."	Physiology at University 10.30–11.30
10–11 "	Anatomy Room " B."	Materia Medica Room " B."	Disease & Treatment Room " B."	Anatomy Quizz Room " C."	Disease & Treatment Room " B."	Anatomy Room " B."
11–12 "	Contagious Diseases Room " B." Section " A."	Cattle Diseases Room " B." Section " B."	Contagious Diseases Room " B." Section " A."	Bacteriology Room " B."	Bacteriology Room " B." Section " B."	.....
1–4 p.m.	Laboratory, Histology or Pathology Room " A."	Laboratory, Histology or Pathology Room " A."	Laboratory, Histology or Pathology Room " A."	Clinic	Laboratory, Histology or Pathology Room " A."	.....
4–5 "	.....	.....	Materia Medica Room " B."	.....	.....	.....
5–6 "	.....	Physiology at University	Tutorial Work	.....	.....	.....

PROGRAMME AND TIME TABLE.—*Continued.*

SPRING TERM.—SESSION 1909-1910.

Third Year.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8–9 a.m. 9–10 "	Tutorial Class Dairy Inspection Room "B."	Tutorial Class Anatomy Room "A."	Tutorial Class Vet. Jurisprudence Room "B."	Tutorial Class Equine Dentistry or Horse Shoeing Room "B."	Tutorial Class Canine and Feline Diseases Room "B."	Tutorial Class Zootechnics Room "B."
10–11 a.m.	Anatomy Room "B."	Materia Medica Room "B."	Disease & Treatment Room "B."	Regional Anatomy and Surgery Room "B."	Disease & Treatment Room "B."	Quizz—January Milk Testing—Feb. Room "D."
11–12 "	Contagious Diseases or Veterinary Hygiene Room "B."	Diseases of Cattle Room "B."	Contagious Diseases or Veterinary Hygiene Room "B."	Bacteriology Room "B."	Bacteriology Room "B."	Zootechnics Room "D." 1–3
1.30–3.30 p.m.	.....	.....	.....	Practical Meat Inspection (10 students)	Practical Meat Inspection (10 students)	Stock Judging
3–4 "	Lecture Meat Inspection Room "B."	.....	Lecture Meat Inspection Room "B."	.....	.....	.....
1–4 "	.....	Clinic	.....	Section "A." Botany at University	Section "B." Botany at University	.....
4–5 "	.....	.....	Materia Medica Room "B."	.....	.....	.....
4–6 "	Laboratory Bacteriology Room "A" Section "B."	Laboratory Bacteriology Room "A." Section "B."	.....	Laboratory Bacteriology Room "A." Section "B."	Laboratory Bacteriology Room "A." Section "B."	.....
5–6 "	.....	.....	Tutorial Work.	.....	.....	.....

Subject to change.

College Association.

In addition to the regular class work of the College and for the purpose of study as well as general information, a student organization has been formed under the name of "Science Association of the Ontario Veterinary College." It is under the control of the College, and operated according to a constitution and by-laws which have been approved.

The object of the Association is to promote fraternal feeling, and by scientific intercourse to further the advancement of veterinary knowledge among its members.

A meeting of the Association is held every Friday evening, and is presided over by the Principal of the College or a member of the faculty.

Membership in the Association is open to students of the third year class, and a certificate is conferred upon each member under the following conditions:

That he shall be a graduate of the Ontario Veterinary College. Also that he shall prepare, present, and defend, at least two essays upon subjects of special interest to the Veterinary profession, at regular meetings of the Association.

The indications at present are that the Association will prove of great value to the College as an educational factor in a variety of ways, as students attend here from many parts of the world, especially North America, and diseases of animals, feeds and feeding, care and management, and other matters pertaining to the veterinary profession in particular, and the live stock industry in general are freely discussed in a systematic manner by young men from the different localities.

Members of the first and second year classes are always guests at the weekly meetings and listen to the discussion of the senior class with marked interest and benefit to themselves.

Donations to the College.

Professor Andrew Smith, F.R.C.V.S., former Principal of the College, presented two scholarships of sixty dollars each—one for the first year to the student who passes the best examination in Anatomy: and one for the second year for the student who passes the best examination in Diseases and their treatment.

Professor Smith has also presented an operating table, which has served a good purpose for demonstrating operations and examinations upon animals in cases where it has been necessary for the operator to have complete control of the animal's movements.

Specimens of diseased tissues of animals as well as diseased plants have from time to time been contributed by the Health of Animals Branch of the Dominion Department of Agriculture; they have proved valuable aids in elucidating the study of the various diseases in which they are concerned and have thus added interest to our course.

I have the honor to be, Sir,

Your obedient Servant,

E. A. A. GRANGE, V.S., M.S.,

Principal.

Temperance Street,

Toronto, October 30th, 1909.

A ward in the Veterinary Infirmary of the College. 1909-1910.

Thirty-First Annual Report

OF THE

Ontario Agricultural and Experimental Union

1909

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1910

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29-37 Richmond Street West,
TORONTO.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1909.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

Toronto, 1910.

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Name.	*Address.*
Ackers, C. J.	Brantford.
Alderwerelt, J. D.	Batavia, Java, E.I.
Allan, F. W.	Churchill.
Andrew, D. A.	Lucknow.
Angle, P. E.	Simcoe.
Augustine, H. W.	Burnaby.
Auld, J. H.	Guelph.
Austin, H. S.	Lynn Valley.
Austin, R.	Tottenham.
Bailey, C. F.	Dept. of Agric., Toronto.
Baldwin, M. M.	Colchester.
Ballantyne, R.	Sebringville.
Barnett, C. A.	Rannock.
Barrett, F. L.	O.A.C., Guelph.
Beckett, R.	South Pelham.
Bell, E. A.	Glanford Sta.
Bengough, W. L.	Toronto.
Bennett, F. A.	St. Thomas.
Bergy, S. A.	Mannheim.
Bethune, Dr.	O.A.C., Guelph.
Bingeman, G. W.	Bridgeport.
Binnie, T. H.	Can. Farm., Toronto.
Bland, A. G.	Kelowna, B.C.
Bond, W. G.	Semans, Sask.
Boyd, F. E. W.	Toronto.
Bradt, E.	York.
Bray, C. I.	Mississippi.
Britton, J. E.	Toronto.
Brodie, G. A.	Bethesda.
Brown, R. W.	Jordan Harbor.
Buchanan, C. W.	Florence.
Buchanan, D.	Florence.
Buchanan, J.	O.A.C., Guelph.
Buchanan, J. H.	Florence.
Burns, J .H.	St. Marys.
Butler, G. C.	Hatfield, Peveril, Eng.
Caesar, L.	O.A.C., Guelph.
Calvert, E. W.	Reaboro.
Cameron, K.	Tiverton.
Campbell, A. D.	Morrisburg.
Campbell, A. M.	O.A.C., Guelph.
Campbell, Jno. A.	Simcoe.
Campbell, W. N.	Victoria, B.C.
Carlaw, G.	Warkworth.
Carpenter, G. H.	Fruitland.
Carpenter, J. F.	Fruitland.
Carroll, Jno. A.	Middlemiss.
Carroll, J. A.	Cowal.
Castro, H. C. Z.	O.A.C., Guelph.
Chaffey, W. F.	Vancouver, B.C.
Clancey, R. H.	O.A.C., Guelph.
Clapp, A. W.	Turnerville.
Clark, E. E.	Meaford.
Clark, G. H.	Dept. of Agric., Ottawa.
Clement, F. M.	Virgil.
Coben, Henry	Kinmount.
Coglan, R. B.	Coutts, Alta.
Cohoe, D. P.	New Durham.
Coke, E. F.	Ottawa.
Coke, J.	Erin.
Collins, G. W.	O.A.C., Guelph.
Cooley, R. B.	Canifton.
Cote, J. C.	Dept. of Agric., Ottawa.
Creelman, G. C.	O.A.C., Guelph.
Crow, J. W.	O.A.C., Guelph.
Culham, G. J.	Toronto.
Curran, G. B.	East Bay, Man.
Cutler, G. H.	Macdonald College, Que.
Darling, E. H.	Lambton.
Davies, E.	Brantford.
Davis, H.	Woodstock.
Davis-Colley, P. H.	O.A.C., Guelph
Davison, W.	Maitland.
Dawson, W.	Vars.
Day, G. E.	O.A.C., Guelph.
Day, W. H.	O.A.C., Guelph.
Dean, H. H.	O.A.C., Guelph
DeCoriolis, E. G.	Cardinal.
Dempsey, P. C.	Trenton.
Dennis, Jas. R.	Weston.
Denton, E.	Vancouver, B.C.
Dorrance, H. A.	Seaforth.
Dougall, R.	O.A.C., Guelph.
Duff, G. C.	Cookstown.
Duff, H. C.	Norwood.
Duncan, R. S.	Galt.
Dunning, H. L.	Thornton.
Eason, F. A.	Keene.
Edwards, S. F.	O.A.C., Guelph.
Ellard, J.	Wright.
Elliott, Geo. W.	Cathcart.
Elton, Cecil	Cowley, Alta.
Emerson, W. W.	Foxboro.
Evans, W. H.	Duncans, B.C.
Fairbairn, J. B.	O.A.C., Guelph.
Falconer, J. M.	O.A.C., Guelph.
Fansher, B. W.	Florence.
Farlinger, W. K.	Morrisburg.
Farmer, P. P.	Toronto.
Faulds, T. B.	O.A.C., Guelph.
Fawcett, C. F.	Upper Sackville, N.B.
'erguson, Jas.	Dalmeny.
Finnie, W. E. B.	St. Mary's.
Fisher, P. A.	Burlington.
Forsyth, F.	O.A.C., Guelph.
Foster, H. E.	O.A.C., Guelph.
Fowler, L. L.	Ventry.
Fowler, R. A.	Moorefield.
Fraser, Jno. F.	Toronto.
Fry, H. S.	Vineland.
Galbraith, A. J.	Hornby.
Galbraith, C. A.	Hornby.
Gamble, W. P.	O.A.C., Guelph.
Gandier, S. H.	Lions Head.
Gardiner, J. F.	McKellar.
Gerow, H. B.	Guelph.
Ghent, C. L.	Hamilton.
Goble, F. W.	Woodstock.
Goldhorn, J. T.	Lethbridge, Alta.
Gorse, A.	Salmon Arm, B.C.
Graesser, F.	Guelph.
Graham, R. R.	O.A.C., Guelph.
Graham, W. L.	Britannia Bay.
Graham, W. R	O.A.C., Guelph.
Grange, J. B.	Toronto.
Graybeil, R. S.	Burnaby.
Green, R.	Oak Leaf.
Grimmer, N. M.	Pender Island, B.C.
Groh, H.	C.E.F., Ottawa.
Hall, J. S.	Ariss.

Hamer, R. S. .....Perth.
Hamilton, T. A. Lorne Park.
Hampson, E. .....Mount Forest.
Hankinson, L. D. ..Aylmer.
Harcourt, Jno. .....St. Anns.
Harcourt, R. .....O.A.C., Guelph.
Hare, J. H. .....Whitby.
Harries, J. F. .....O.A.C., Guelph.
Hart, F. C. .....Galt.
Hart, M. .....Calgary, Alta.
Hayes, W. H. .....St. John, N.B.
Hefler, F. .....Exeter.
Heggie, G. O. .....Somenos, B.C.
Henderson, I. B. ...Hampden.
Henry, F. ..... Clinton.
Henry, G. S. .....Oriole.
Henry, L. B. .....Winona.
Herner, M. C. .....Mannheim.
Herridge, H. W. ...Nakusp, B.C.
Hextall, L. J. .....Calgary, Alta.
Hiddleston, J. S. ...O.A.C., Guelph.
Hill, G. E. .....Claremont.
Hill-Tout, H. J. ....Abbotsford, B.C.
Holman, W. .....O.A.C., Guelph.
Honey, G. L. .....Port Perry.
Hood, E. G. .....Hagerman.
Hopkins, E. S. ...Lindsay.
Hopkins, S. H. ...Sardis, B.C.
Howard, C. F. ... Hagersville.
Howell, J. S. .....Jerseyville.
Howitt, M. H. ... Hamilton.
Howlett, W. .....Winterbourne.
Humphrey, J. .....Scarboro.
Hunt, Wm. .....O.A.C., Guelph.
Hutt, H. L. ..... O.A.C., Guelph.
Jack, James ..... Glenmorris.
Jackson, L. D. ... O.A.C., Guelph.
Jarvis, E. W. .....Grimsby.
Jarvis, G. L. .....Grimsby.
Jeffrey, W. N. .....Stratford.
Jenkins, G. J. ....Todmorden.
Jenkinson, R. H. .Wexford.
Jewson, J. E. .....Stone Quarry.
Johnson, D. M. .. Myrtle Station.
Johnson, J. .....Navan.
Johnston, G. T. ...Grafton.
Johnston, S. C. ...Islington.
Jones, D. H. .....O.A.C., Guelph.
Jones, T. K. .....Gravenhurst.
Kay, H. R. .....Merrickville.
Kelly, W. A. ..... Aldboro.
Kennedy, S. ..... Apple Hill.
Kerr, Wm. .....Bronson.
Kerr, W. A. .....Balsam.
Kitchen, Erle .....St. George.
Klinck, C. R. .....O.A.C., Guelph.
Klinck, L. S. .....Macdonald College, Que.
Knapp, J. S. .....Merrickville.
Knauss, H. L. ....Detroit, Mich.
Kyono, J. .....Southampton, N.Y.
Laird, Geo. ..... Cedar Rapids, Iowa.
Laird, J. O. ..... Blenheim.
Landles, B. H. ...River Herbert, N.S.
Lane. M. .....Kinlough.
Learmonth, C. M. Galetta.
Lehman, A. ..... Strathcona, Alta.
Leuton, E. E. .....St. Thomas.
Lewis, C. E. .....Essex.
Lindesay, H. H. ..Ottawa.
Lloyd-Jones, J. G. O.A.C., Guelph.
Logsdail, A. J. .. Jordan Harbor.
Longley, W. V. .. Paradise, N.S.
Madden, G. O. ....Toronto.
Mansfield, A. L. ..Rideau View.
Marcelis, F. N. ....North Winchester.
Martin, D. H. ....Whitechurch.
Martin, N. R. ....Corinth.
Mason, A. W. .... O.A.C., Guelph.
Mayberry, H. .....Ingersoll.
Melhado, G. S. ....O.A.C., Guelph.
Mendoza, H. P. ...O.A.C., Guelph.
Metcalfe, I. F. .....Collingwood.
Miles, A. F. .....Creemore.
Miller, Henry ..... Arrow Park, B.C.
Miller, J. .....Mt. Elgin.
Monroe, F. A. .....Guelph.
Monteith, Hon. N. .Stratford.
Mooney, J. A. ....Regina, Sask.
Moore, J. A. C. .. Islington.
Moore, P. H. .....Brookings, S.D.
Moore, W. H. M. ..Caledonia.
Moorehouse, R. L. Cairo.
Morewood, John .. Quebec, Que.
Motherwell, R. ...Abernethy, Sask.
Murray, H. G. ....Toronto.
Murray, R. H. ... Avening.
McArthur, Jno. ...Hensall.
McCallum, J. M. .. Shakespeare.
McCarthy, D. J. ...Kingston.
McDonald, D. S. ..Appin.
McDonald, J. C. ...Montreal, Que.
McEwen, L. .....Wroxeter.
McIlquham, J. M. Lanark.
McIntosh, A. D. ..Collingwood.
McKay, M. C. .....Scotsburn, N.S.
McKenney, A. ....Essex.
McKenzie, D. A. ..Lindsay.
McKenzie, N. D. ..Galt.
McMeans, A. .....Fargo, N.D.
McMillan, A. .....Box 50, Dutton.
McRostie, G. P. ...Metcalfe.
McTaggart, A. ....O.A.C., Guelph.
McVannel, A. P. ..Picton.
McVicar, G. D. ...Cayley, Alta.
Neff, E. F. .....Hamilton.
Neville, S. J. .... Cottonwood, Sask
Newhall, H. W. ...Toledo, Ohio.
Nicholson, C. .....Mount Forest.
Nicholson, H. W. ..Mount Forest.
Nixon, C. C. ..... Peterboro.
Nixon, H. C. .....St. George.
Noble, J. W. .....Hornings Mills.
Northcott, S. A. ..Taunton.
Nunnick, F. C. ....Scotland.
Oliver, A. R. .....Staffa.
Owen, W. H. .....Hull, Eng.
Palmer, B. G. .....Norwich.
Palmer, E. B. ....Carlyon.
Palmer, W. E. ....Marshville.
Pardy, C. .....Cooksville.
Partridge, A. W. ..Crown Hill.
Pate, A. W. .....Brantford.
Patrick, J. .....Alton.
Pawley, N. H. ....Mayfield.
Pearson, T. R. ....New Westminster, B.C.
Peart, G. S. .....Freeman.
Peart, H. S. .....Jordan Harbor.
Peters, Chas. .....Elmhurst, N.B.

Pettit, M. .....O.A.C., Guelph.
Phillips, H. L. ....O.A.C., Guelph.
Pope, J. C. .....Regina, Sask.
Porter, W. H. .....Kinsman's Crs., N.S.
Presant, H. E. ....Guelph.
Price, W. J. .....Wingham.
Putnam, G. A. ....Toronto.
Ralph, C. H. .....Salt Lake City, Utah
Ramage, Jas. .....St. Helens.
Ramsay, R. L. ....Bladworth, Sask.
Raynor, Dr. M. ...Tofino, B.C.
Raynor, T. G. .....Dept. of Agric., Ottawa.
Readey, J. C. .....Hillier.
Rebsch, C. S. .....Peachland, B.C.
Reed, F. H. .....Regina, Sask.
Reed, R. M. .....Cleveland, Ohio.
Reeves, F. S. .....O.A.C., Guelph.
Reeves-Palmer, T. Mohawk.
Reid, H. .....O.A.C., Guelph.
Reid, Peter .....Chateauguay Basin, Que.
Renwick, F. W. ..Romney.
Renwick, J. F. ....Romney.
Rettie, J. E. .....L.ving Springs.
Revell, H. K. .....Walkerville.
Revett, T. B. .....Dept. of Agric., Toronto.
Reynolds, J. B. ...O.A.C., Guelph.
Riley, Jas. J. .....Graham, Que.
Robb, O. .....Sheffield.
Roberts, W. B. ....Sparta.
Robertson, A. ....Rosser, Man.
Robertson, G. A. . St. Catharines.
Robertson, W. H. .Barrington Passage, N.S.
Robinson, E. .....O.A.C., Guelph.
Robinson, J. D. ...Washington, D.C.
Rose, D. M. .....Trin. Univ., Toronto.
Ross, Theo. .....Charlottetown, P.E.I.
Rothwell, G. .....Ottawa.
Rutherford, R. L. .River Herbert, N.S.
Ryrie, H. S. .....Oakville.
Sackville, J. P. ...Bewdley.
Salkeld, D. G. ....Goderich.
Sampson, S. J. ... O.A.C., Guelph.
Sanders, G. .....Urbana, Ill.
Saunders, E. .....Kelowna, B.C.
Schartow, C. H. ..Corvallis, Oregon.
Scholfield, E. A. ..St. John, N.B.
Scott, W. R. M. ...Toronto.
Searson, S. H. ....Calgary, Alta.
Shantz, Allen ....Waterloo
Shantz, A. J. .....Hespeler.
Shaw, A. M. .....Niagara Falls. S.
Shepherd, W. F. ..Bridgeport.
Shibley, C. S. .....Harrowsmith.
Shorthill, R. J. R. Ballinafad.
Sibbald, W. M., Jr. Sutton West.
Sinha, S. .....Ithaca, N.Y.
Sirett, A. W. .....Rosseau.
Sirett, H. .....Carp.
Slater, A. E. .....O.A.C., Guelph.
Sloan, R. R. .....Blyth.
Smith, A. S. .....Chesterville.
Smith, J. E. ..... Shallow Lake.
Smith, J. V. B. ...Wanstead.
Smith, R. B. .....Columbus.
Smuck, I. .....Renforth.
Smye, G. C. .....Ayr.

Sorley, J. N. .....Cummings Bdge.
Spencer, J. B. ....Ottawa.
Spry, J. .....Easton's Cors.
Squirrell, W. J. ...O.A.C., Guelph.
Stafford, E. .....Toronto.
Stairs, K. ..... Halifax, N.S.
Staniforth, A. ....O.A.C., Guelph.
Stanley, C. W. ....Granton.
Stark, J. W. .....Chatham.
Steckly, J. C. .....Bethesda.
Sterling, J. H. ....Eglinton.
Stewart, A. .....Strath Gartney, P.E.I.
Stratton, R. W. ...O.A.C., Guelph
Taggart, J. G. .....Onslow, N.S.
Taylor, F. .....Cumberland Mills, Que.
Taylor, G. .....O.A.C., Guelph.
Tennant, L. .....Falkland
Terry, J. .....O A.C., Guelph.
Tomlinson, A. H. .Victoria, B.C.
Thompson, Hugh ..Magnetawan.
Thompson, R. G. ..Boharm, Sask.
Thompson, S. ....Strathroy.
Tinney, T. H. .....Medicine Hat, Alta.
Tipper, R. M. .....Ashburn.
Tisdale, W. H. J. ..Paris.
Todd, S. E. .....O.A.C., Guelph.
Toole, A. .....Mount Albert
Toole, W. .....Whitevale.
Tregillus, C. A. ..Calgary, Alta.
Tucker, H. S. .....Chapman.
Underhill, M. ....Richard's Landing.
Unwin, G. H. .....O.A.C., Guelph.
Upton, H. E. .....Peabody, Mass.
Vansickle, P. O. ..Trinity.
Wade, R. W. .....O.A.C., Guelph.
Walker, Wm. .....O.A.C., Guelph.
Wallace, G. M. ..Kars.
Ward, A. C. .....Glanford Sta.
Warren, F. B. ....Gamebridge.
Waters, B. J. .....Coldstream.
Wearne, H. .....O.A.C., Guelph.
Weber, M. .....Winterbourne.
Webster, F. E. ...Creemore.
Webster, H. B. ....Science Hill.
Weekes, H. .....Glencoe.
Weir, E. A. .....Randwick.
Wells, E. A. .....Chilliwack, B.C.
Wenger, A. A. ....Ayton.
Westover, C. A. ...Freleighsb rg, Que.
Whale, I. B. .....Goldstone.
Whaley, E. A. .....Brownsville.
Wheaton, R. R. ...Thorndale.
White, E. W. .....New Westminster, B.C.
Whiteside, E. A. ...O.A.C., Guelph.
Wilkinson, P. J. ..Cambray.
Wilson, J. A. .....Mt. Elgin.
Wilson, Geo. .....Oakville.
Wilson, S. .....Rolling Dam, N.B.
Woltz, G. L. .....Hartford.
Wood, C. .....O.A.C., Guelph.
Woods, Jno. ..... Jordan Harbor.
Wright, L. W. ....Harriston.
Young, J. M. .....Masonville.
Yule, J. C. .....East Selkirk, Man.
Zavitz, C. A. .....O.A.C., Guelph.
Zavitz, E. J. .....O.A.C., Guelph.

Ontario Agricultural and Experimental Union

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Vice-President .....W. J. Lennox, Newton Robinson, Ont.
Secretary and Editor .....C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary .....J. Buchanan, Agricultural College, Guelph.
Treasurer .....H. L. Hutt, Agricultural College, Guelph.
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Horticulture .....Prof. J. W. Crow (Director), H. S. Peart and A. McMeans.
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TREASURER'S REPORT, 1909.

Receipts.		Expenditures.	
Balance from last year .....$	218 68	Agricultural experiments .....$	1,766 11
Membership fees, 388 at 50c...	194 00	School garden experiments	428 54
Government grant	2,750 00	Chemical experiments	54 33
		Vegetable experiments	4 20
Total	$3,162 68	Reporting Annual Meeting, 1908	43 00
		Expenses Annual Meeting, 1909	120 50
		Interest on money borrowed...	2 25
		$	2,418 93
		Balance on hand	743 75
		$	3,162 68

We, the undersigned auditors, declare that we have examined the Treasurer's accounts and found them correct.

W. J. Squirrell,

J. B. Fairbairn,

Auditors.

December 4th, 1909.

Agricultural and Experimental Union

ANNUAL MEETING.

The thirty-first annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday and Wednesday, December 6th, 7th and 8th, 1909.

The President of the Union, Mr. J. O. Laird, Blenheim, presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the annual supper on Tuesday evening.

SECRETARY'S REPORT.

By C. A. Zavitz, Professor of Field Husbandry, Guelph.

The co-operative work of the Experimental Union has been enlarged and improved during the past year. It is now twenty-four years, or almost a quarter of a century since the present system of co-operative experimental work was started in a small way by the Experimental Union. From the beginning it has gradually increased in extent and in influence throughout the Province. We have now hundreds of men throughout Ontario who have successfully conducted experiments on their own farms for five or more, and even up to ten, twelve, or fourteen years. In 1909, the co-operative work was conducted on farms throughout Ontario in Agriculture, Horticulture, Forestry and Poultry-raising, and in connection with the Public schools in elementary Agriculture, Horticulture, and Forestry. Although a limited amount of work in connection with the schools had been conducted in previous years, it was not until 1909 that this branch of the work was placed under a separate committee. We are pleased to state that the work in connection with the schools has been largely increased this year and we believe that there are excellent opportunities for great development along this line.

The co-operative work in Agriculture has been conducted for a longer time than that of any other department. The number of co-operative experiments for the twenty-four years from 1886 to 1909 is 54,345. In Agriculture alone definite experimental work was conducted on measured plots on no less than 4,853 farms in 1909. There are now no less than 38 separate experiments which cover all the most important farm crops in the Province of Ontario, and which deal with varieties of crops, mixtures of grains and grasses, application of commercial fertilizers, and different methods of cultivating the soil.

In Horticulture, the total number of co-operative experiments for the sixteen years from 1894 to 1909, inclusive, is 9,571. In 1909, owing to a re-arrangement in the Horticultural department of the College, the co-operative work of the Experimental Union was entirely dropped for the present excepting the growing of onion seed and the work in connection with the schools of the Province.

In the department of Agricultural Chemistry, co-operative work has been carried on in the study of muck soils by the use of commercial fertilizers.

The departments of Forestry and of Poultry-raising have again been conducting work during the past year. As the work undertaken by the Poultry Department, however, requires a number of years for its development, the results are as yet incomplete.

It is impossible to estimate the influence of the co-operative experiments in Ontario in bringing twenty-five to thirty thousand farmers to visit the College annually, in over-flowing the College with students, in doubling the output of Ontario farms during the past sixteen years, and in the betterment of both the farmers and the farms of Ontario.

The experimenters deserve great credit and the hearty thanks of the farmers of Ontario for the excellent work which they are doing, not only for themselves and the neighboring farmers but also for the improvement of the agriculture of the country. As many of the experimenters combine the practical experience obtained on the farm, the educational training secured at the Agricultural College, as well as the special training furnished by successfully conducting co-operative work on their own farms for several years in succession, the reports are becoming more valuable from year to year. It is certainly correct to say that the Experimental Union has an excellent corps of experimenters. While it is true that these men have done most excellent work in the past, we believe that even greater success awaits the Experimental Union in the future.

The Board of Control of the Experimental Union has held three meetings during the past year, two in December, 1908, and one in September, 1909.

About 30,000 copies of the Annual Report of the Experimental Union for 1908 were printed and distributed by the Ontario Department of Agriculture in the early part of the present year. We are also greatly pleased with the publication of the results of the Union through the Agricultural journals and the leading newspapers of the Province. It will therefore be seen that a very large number of the farmers of Ontario had an opportunity of reading and studying the results of experiments conducted throughout Ontario in 1908.

Many of the States of the American Union and some of the countries in Europe have started co-operative experimental work somewhat similar to that which was commenced in Ontario almost a quarter of a century ago. May the work of the past encourage us to better and greater things in the future and to thus make our work more perfect and more worthy of imitation.

PRESIDENT'S ADDRESS.

By J. O. Laird, Blenheim.

Another year has passed beyond our recall, and again we have come together to hear and discuss the results of the work of the Ontario Agricultural and Experimental Union, and try to learn something that will be of value to us as agriculturists in the years that are still before us.

On behalf of myself and the other members of the Union executive, I extend to the visitors, officers, ex-students, and students of the College a most hearty welcome to this, the thirty-first annual meeting of the Experimental Union, and I hope that everyone will feel free to ask any questions that may occur to him as the meeting proceeds, and that we will not only have addresses on the various sub-

jects upon the programme, which will be instructive, but that the discussions upon these subjects will teach us much, and broaden our ideas along agricultural lines.

During the past year experiments have been conducted throughout Ontario in the departments of Agriculture, Horticulture, Forestry, Poultry-raising, Bee-keeping and Agricultural Chemistry. In Agriculture alone, experiments have been conducted upon over 4,850 farms. These figures show us the extent of the Union's work, and although not nearly all of the experimenters may have sent in reports complete in every detail, there are a great many of these who will be greatly benefited by what they have done. As a result of the material sent out by the Union, many a farmer has worked himself into a different variety of oats, wheat, corn, peas, or whatever the material may have been, which has meant a direct increase in the income of the farm. Not only the experimenter has benefited, but his results have encouraged others to try to increase the yield of their crops also. We do not hesitate to say that the work of the Experimental department of the College, through the experiments conducted by the members of the Union, has meant millions of dollars to the Province of Ontario; and this influence is also felt in the other Provinces of the Dominion. The growth of the Experimental Union, since it was first formed in 1880, has perhaps not been phenomenally rapid, but it has been steadily growing year by year, and we have every reason to believe it will continue to do so.

No better movement has ever been set on foot in this or any other country than that method by which the counties of this Province may be supplied with a trained agriculturist, to teach the subject in High Schools, and most of all to provide an "Agricultural Doctor" to whom the farmers may take their troubles and get the latest treatment for these troubles. These men, who have been placed in several counties of the Province of Ontario, are now looked upon by the people as one of the greatest assets of the county. Could not some experiments be conducted under the direction of these county representatives, and then the reports be given by the representatives at the annual meeting of the Experimental Union. Take for example, an experiment in the use of commercial fertilizers. The results from the Province as a whole might not be just satisfactory, whereas, if the experiments were conducted in each county, more care could be taken that the soil and conditions on the several farms were more uniform, thus producing more valuable results.

The beneficial results of the Union have been brought about by the co-operation among its members. And so will beneficial results appear in every line of farming when co-operation is practised to a greater extent. The idea that a good many farmers and others have, that it would be impossible for farmers to manage a co-operative business successfully, has done a great deal to hinder the growth of co-operation among farmers. But the results of co-operation in the fruit and dairy business and in other lines also, show that farmers are awakening to the advantages of co-operation. Co-operation among farmers may in some cases be hard on the middleman, but no farmer will begrudge him a farm in any part of the country, and there he can become a producer himself. And also, we as farmers do not stop to think, that if we were to band ourselves together, we might have four times as many farmers in our Government Houses as we have at the present time, and surely this would mean the advancement of agriculture.

With the advent of rural free mail delivery, the electric road, the telephone, and in many sections the supply of natural gas for fuel, the farmer certainly has a good many of the advantages enjoyed by his city friends, and without paying so dearly for them. All these later additions to farm life undoubtedly make it more

enjoyable, and yet they appear to have brought with them somewhat of the hurry and bustle of the great city. And this makes it more necessary than ever before, that the farmer should be a man of education, in order to compete in a business-like manner with men in other callings. There is no better place to secure this education than at the Ontario Agricultural College. It is not only the technical training which benefits the student, but also the broadening of his views along general lines, and that education acquired by coming in contact with many men who have come from places where the conditions, manners and customs are at least somewhat different from those surrounding the individual student in his own community.

Not least among the benefits to the experimenter is that habit of neatness which is taught him while conducting any experiment, and this, no doubt, has a tendency to make the farmer more neat in all his work, and in some instances may even have an influence upon his personal neatness. For I believe that the farmer has been in the past debarred of his proper social position, owing to the fact that farmers, as a class, are not careful enough about their personal appearance. He, no doubt, feels independent, but I think that as a rule, the farmer would be more highly respected if he wore a little better clothes. The price of farm produce for the last few years has been very good, and the farmer will feel more proud of his calling if he shows the city and town people by his manner and dress that he is enjoying the better reward he is getting for his labor. Ralph Connor's latest book, "The Foreigner," in speaking of the change that came over the little Galician girl, when she discarded her Galician garb and came forth as a Canadian young lady, says: "For such subtle influence does dress exercise over the mind, that something of the spirit of the garb seems to pass into the spirit of the wearer." The farmer has certainly no need to be ashamed of his calling, and it is his duty to see that the calling has no reason to be ashamed of him.

Again, I extend to you all a most hearty welcome to the Union meetings, and invite you to ask any questions and discuss the various topics freely. Let us try to have a most pleasant and profitable session; one that will make our business more profitable and the approaching New Year happier and brighter, because of our having met here. And let us strive towards the goal of perfect agriculture, and remember that, as a great man has said, "Upon the rise and fall of Agriculture depend the rise and fall of Empires."

G. S. Henry: I am sure it is a pleasure for me to be here again at another meeting of the Experimental Union, and in a small way to take part in the programme. My mind has been drawn back this afternoon to the first day I visited the Ontario Agricultural College. After I had been here a day or two, in talking with my room-mate, who was a senior, while I was only a freshman, he said: "There is a great deal of good done here in one way and another, and the greatest things that are done by the College are due to Charlie Zavitz." (Applause). I had scarcely heard of Mr. Zavitz at that time. It was evident to a third year student at that time what great progress was being made along experimental lines under the direction of Mr. Zavitz, and I am sure we have every reason to say, at the present time, that double the work is being done and the results are much greater than they were ten or twelve years ago.

I cannot see my way clear to criticise the President's address except along the lines of his extreme modesty. I think it is hard for us to estimate the results that have come from co-operative experiments carried on here by the College. We all realize that agriculture in the Province of Ontario is in the process of evolution.

We are changing from the old line of grain growing, and the growing of what are really called "raw materials," to the production of the finished product.

Ontario is ceasing to take any great part in the production of the cereal foods for selling from the farm. We are now looking more to stock raising and dairying, and while this process has been going on, the College and the Experimental Union have a mission to perform. Ex-students and students have a part in this work, and we realize that they have been playing their part in educating the average farmer and showing him how he can get better results for his labor. Farming is not just the production of wheat, but there is an art in agriculture and a science that needs care and deep study if we are to get the very best results.

Possibly that part of the President's address which deals with co-operation is one of the most striking features. Co-operation in experimenting reaches the farmer and shows him the advantages that are to be derived from a more thorough study of crops and a better system of cropping.

I would like to impress upon the students, especially the freshmen, that they should attend the Experimental Union, and should not be backward in getting up and asking questions. The result to be obtained by these meetings largely depends upon the interest the audience takes in them, and the questions that are asked and the discussion of the various papers and subjects that are brought before us. The reports of the experimental work that has been carried on throughout the Province by Professor Zavitz are very important, and we will have a meeting of the Union that will go down to history as a successful one, if we all do our part in asking questions and in getting and giving all the information possible.

I am sure I am very pleased to be here this afternoon. I am looking forward to these meetings of the Experimental Union with great interest as I have always done in the past. I come back year after year and find that with every year I get some new ideas in agriculture by rubbing up against those who have been working out problems for themselves. I gain information that is of value to me, not only from a practical nature but from a social and educational standpoint. I trust we will all get splendid results from this meeting, and that the subjects brought up will be discussed freely and intelligently.

THE PRESIDENT: I am very glad that Mr. Henry emphasized that last point, because I think the success of a meeting depends upon the audience largely. We want a full and free discussion and we invite all to take part. If you do not ask questions, you may be keeping back some thought which would be of much value to others.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

BY C. A ZAVITZ, PROFESSOR OF FIELD HUSBANDRY, O.A.C., GUELPH.

The co-operative experiments in Agriculture were conducted on a greater number of Ontario farms in 1909 than in any year previous. No less than 4,856 men were actually engaged in conducting these experiments during the past year. This is an increase of 430 over 1908, and of 820 over 1907. Owing to lack of help, finances and material, we were unable to supply 739 applicants with material for experimental purposes in 1908, and 841 applicants in 1909. We are greatly pleased with the continued interest in this important work throughout the country, and with the enthusiasm by which it is carried on.

The spring of the present year was exceptionally cold and wet, which thus prevented the usual early seeding of some of the crops. Many of our farmers feared that owing to the lateness of the season, the crops would probably be considerably below the average in productiveness. We are pleased to state, however, that in most cases the farm crops in Ontario have given yields which are about normal. In some localities, however, the dry weather in the middle of the summer caused some of the farm crops, especially potatoes, to be comparatively light in yield. I think I am safe in saying that never since the co-operative work of the Experimental Union was started in 1886 has there been a larger number of satisfactory reports received in any one year. We are greatly pleased with the character of the work of a large number of our experimenters. They deserve great credit for successfully conducting the various experiments, and farmers owe much to these men for the valuable reports which they furnish, and which are here presented in a summary form. We commend these reports as being worthy of very careful study by the people of Ontario who are concerned in the growing of farm crops. As these co-operative experiments have been conducted in every county and district, and probably in every township of the Province during the past year, the results should be not only of local but also of general interest, and should give service of great value. The Experimental Union has had a marked influence in increasing the market values of the farm crops of Ontario. Not only does it aid the experimenters themselves, but it also helps to develop the whole country. Besides the financial aid which it gives, it also encourages neatness and method in work, close observation, accurate calculation, thoughtful inquiry, and many other important agencies which help so much in the education of the people.

The co-operative work is, to a large extent, the outgrowth of the experimental work done at the College, and it is principally based on the results obtained at the College through a long series of years. The experimental work in Field Agriculture was started at the College in 1876, and since that time it has gradually developed along various lines until at present fully two thousand plots are used annually in experiments with grains, fodder crops, grasses, clovers, roots and potatoes; in testing manures and fertilizers; in comparing different methods of cultivation, etc., with the object of obtaining information regarding the best varieties; the most productive selections of seed; the best time to sow the various classes of crops; the most important methods of cultivation; the best mixtures of seed for the production of grain, green fodder, hay and pasture; the best methods of maintaining and increasing the fertility of the soil, etc. Since the beginning of the work, each of fully two thousand varieties of farm crops has been tested at the College for at least five years. A large amount of work is now being carried on in the improvement of the best varieties of farm crops by means of systematic selection and by cross-fertilization. In past years, those varieties of crops which gave the best results at the College, have been used in the co-operative experiments. Some of the new strains obtained by selction are now being incorporated into the work, and we hope before long to be able to distribute some of the very best of the new hybrids which are being created in the plant-breeding nursery in the experimental grounds. Besides the testing of varieties throughout Ontario, co-operative experiments are also carried on with mixtures of grains and grasses, with manures and commercial fertilizers, with methods of cultivating the soil, etc.

In the spring of each year circulars on the co-operative work are distributed by the agricultural committee appointed by the Union. These circulars give a list of all the experiments for which material can be furnished. They are sent by mail to the members of the Experimental Union; to the experimenters of former years

who have done satisfactory work; to leading farmers whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, and inspectors of Public Schools. They are also sent to all persons asking for information regarding the co-operative work; and to all the newspapers of the Province. In this way, the work is brought to the notice of a very large proportion of the farmers of Ontario. The following gives the list of the co-operative experiments in agriculture, conducted throughout Ontario in 1909.

CO-OPERATIVE EXPERIMENTS IN 1909.

	Plots.
Spring Grain Crops.	
1 —Testing three varieties of Oats	3
2*a*—Testing three varieties of six-rowed Barley	3
2*b*—Testing two varieties of two-rowed Barley	2
3 —Testing two varieties of Hulless Barley	2
4 —Testing two varieties of Spring Wheat	2
5 —Testing two varieties of Buckwheat	2
6 —Testing two varieties of Field Peas	2
7 —Testing Emmer and Spelt	2
8 —Testing two varieties of Soy, Soja, or Japanese Beans	2
9 —Testing three varieties of Husking Corn	3
Root Crops.	
10 —Testing three varieties of Mangels	3
11 —Testing two varieties of Sugar Beets for feeding purposes	2
12 —Testing three varieties of Swedish Turnips	3
13 —Testing two varieties of Fall Turnips	2
14 —Testing two varieties of Carrots	2
Forage, Fodder, Silage and Hay Crops.	
15 —Testing three varieties of Fodder and Silage Corn	3
16 —Testing three varieties of Millet	3
17 —Testing two varieties of Sorghum	2
18 —Testing Grass Peas and two varieties of Vetches	3
19 —Testing Rape, Kale and Field Cabbage	3
20 —Testing three varieties of Clover	3
21 —Testing two varieties of Alfalfa (Lucerne)	2
22 —Testing four varieties of Grasses	4
Culinary Crops.	
23 —Testing three varieties of Field Beans	3
24 —Testing three varieties of Sweet Corn	3
Fertilizer Experiments.	
25 —Testing fertilizers with Potatoes	8
26 —Testing fertilizers with Swedish Turnips	6
Miscellaneous Experiments.	
27 —Sowing Mangels on the level, and in drills	2
28*a*—Testing two varieties of Early Potatoes	2
28*b*—Testing two varieties of medium ripening Potatoes	2
28*c*—Testing two varieties of Late Potatoes	2
29 —Testing three grain mixtures for grain production	3
30 —Testing three mixtures of Grasses and Clover, for hay	3
Autumn Sown Crops.	
31 —Testing three leading varieties of Winter Wheat	3
32 —Testing two leading varieties of Winter Rye	2
33 —Testing five Fertilizers with Winter Wheat	6
34 —Testing Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat	5
35 —Testing Winter Emmer with Winter Wheat or Winter Barley	2
36 —Testing Hairy Vetches and Winter Rye as Fodder Crops	2

Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. In former years, some plots consisted of one-tenth acre and a few of one-half acre in size, but for most experiments these were found less satisfactory than the small plots.

For the following summary, only the results given in the most reliable reports were used. Many of these reports have been sent in by men who have had a large amount of practical experience on the farm; have had the advantages of a good education, and by means of conducting experiments in former years have become quite expert in the work. It should be remembered, however, that while only the good reports of carefully conducted experiments have been used for publication, many of those not included in the summary show that the individual experimenters must have obtained a considerable amount of value from the work. It frequently happens that, owing to some unavoidable accident, the experiment may have been injured to some extent so that the results could not be used in the general summary, and yet the experiment may have furnished useful lessons to the farmer conducting it. In all cases experimenters obtain much more information from the work which they have carried on than can be given in a tabulated report.

Very carefully prepared instructions for conducting the co-operative work were furnished each experimenter in the spring of the year. While these instructions were not so elaborate but what they could be carried out in every detail, they were sufficiently comprehensive and specific to cover the important parts of the experiment in the search for reliable and valuable information, from a practical point of view. Besides various questions regarding the details of the experiments, the different experimenters were asked to give their decision as to the relative standing of the different varieties, mixtures, methods of cultivation, and fertilizers, taking everything into consideration bearing on the various phases of the experiments and on their own knowledge of their requirements regarding the soils of their farms, the systems of farming practised, the requirements of the markets, etc. The summary of the answers to this line of inquiry is presented in the tabulated results under the heading of comparative value.

Grain Crops.

About six million acres of land in Ontario are devoted annually to the production of grain crops. The market value of the grain crops grown in the Province in 1908 amounted to approximately $100,000,000. It will therefore be seen that the grain crops occupy an exceedingly important place in the agriculture of the Province. It has been the aim of the department of Field Husbandry at the College and of the agricultural committee of the Experimental Union to conduct experiments which would be of great value in increasing both the quality and the yields per acre of these crops throughout the Province. It is interesting therefore, to notice that the average annual increase in yield per acre of each of our principal grain crops of the last twelve years, as compared with the twelve years previous, is as follows:

Barley	22.7 per cent.
Oats	15.1 " "
Winter Wheat	11.3 " "
Average	16.4

As these estimates are obtained from the reports of the Bureau of Industries for Ontario, it seems to indicate very strongly indeed that there are agencies at

work in Ontario which are having a very marked influence on the crop production of the Province.

TABLE NO. I.—GRAIN CROPS.

Experiments.	Varieties.	Comparative value.	Yield per Acre. Straw.	Grain.	Grain.
			Tons,	Lbs.	Bus.
Oats, (133 tests)	Siberian	100	1.23	1,414	41.60
	Sensation	96	1.12	1,382	40.64
	Daubeney	67	.96	1,302	38.28
Six-rowed Barley (30 tests)	O. A. C. No. 21	100	1.08	1,649	34.45
	Mandscheuri	88	1.10	1,578	32.88
	Oderbrucker	66	1.06	1,433	29.85
Two-rowed Barley (3 tests)	Hanna	100	1.07	1,626	33.88
	Two-rowed Canadian	88	.69	1,454	30.28
Hulless Barley (15 tests)	Guy Mayle	100	.87	1,574	26 24
	Black Hulless	81	.87	1,424	23.73
Spring Wheat (12 tests)	Wild Goose	100	1.27	1,334	22.23
	Red Fife	74	1.05	1,117	18.61
Buckwheat (3 tests)	Rye	100	1.52	1,014	21.12
	Silver Hull	88	2.08	854	17.78
Emmer and Spelt (8 tests)	Common Emmer	100	1.08	1,815	45.38
	Red Spelt	43	.98	1,190	29.76
Winter Wheat (21 tests)	Imperial Amber	100	1.42	1,447	24.11
	Abundance	84	1.27	1,433	23.88
	Bulgarian	68	1.20	1,312	21.86
	Nigger	55	1.37	1,311	21.85
Winter Rye (10 tests)	Mammoth	100	1.55	1,572	28.07
	Common	61	1.44	1,239	22.12
	Washington	56	1.18	1,096	19.57
Field Peas (45 tests)	New Canadian Beauty	100	1.02	1,278	21.29
	Early Britain	88	89	1,234	20.56
Field Beans (13 tests)	White Wonder	85	1.65	1,802	30.04
	Marrowfat	100	2.00	1,762	29.36
	New Prize Winner	100	1.31	1,737	28.95
			Whole Crop.		
Corn for Grain (10 tests)	Genesee Valley	100	8.60	2,568	45.86
	Compton's Early	71	9 21	2,444	43.64
	King Phillip	79	8.05	2,410	43.04
			Straw.		
Mixtures (7 tests)	Daubeney Oats, 34 lbs. per acre Mandscheuri Brly. 48 " " Siberian Oats, 25 " " Two-row.Can.Brly. 35 " "	100	1 11	1,518	.....
	Wild Goose Sp.Wht. 22 " " Siberian Oats, 34 " " Two-row.Can.Brly. 48 " "	58	1 05	1,090	.....
		74	.96	1,037	.....

In the table here presented, the yield of straw, as given in the second column, represents the total crop less the amount of grain, and therefore includes the chaff with the straw. The yield of grain is given in pounds and also in bushels per

acre in order that the results may be more clearly understood, and that comparisons may be made between the different classes of crops as well as between the varieties of each class. Owing to the great variation in the weight per measured bushel of the different crops, it is easier to compare the results in pounds than in bushels per acre.

The average results of the successfully conducted co-operative experiments with varieties and with mixtures of grain crops are presented in Table I.

Varieties of Oats. The oat crop is the most important of all the farm crops grown in Ontario at the present time. The area devoted to oats annually amounts to nearly 3,000,000 acres, and the market value approximates $40,000,000. About two hundred and fifty varieties of oats have been under experiment at the Ontario Agricultural College within the past twenty-one years. New varieties have been introduced from time to time, and after five years' tests the poorer kinds have been dropped, and those which have given the most satisfactory results have been retained in the tests. Nearly all of the varieties here referred to have been grown at the College for at least five years in succession, and a few of them have been under test for fully twenty years. Those varieties which have given the best average yields per acre at the College during the last five years are the Siberian, the Daubeney and the Alaska. The two first varieties, along with the Sensation, form the three varieties used in the co-operative experiments throughout Ontario in 1909. The Siberian oats were imported by the College from Russia in the spring of 1889. They possess straw of good length which usually stands up very well. The head is of a spreading character and the grain is white in color and has about 30 per cent. of hull. The Sensation variety of oats has nearly always produced a less yield of grain per acre, but the grain is quite attractive in appearance and is about the same in quality as the Siberian. The Daubeney variety is very early and is one of the best kinds of oats for mixing with the Mandscheuri barley for growing the two in combination, as these two grains require about the same length of season to reach maturity. The grain of the Daubeney oats, although a little slender in appearance, is of excellent quality, usually furnishing five or six pounds more meal per hundred pounds of grain than the Siberian or the Sensation, and about eight pounds more meal per hundred pounds of grain when compared with the Banner. The average results of the co-operative experiments with these three varieties in 1909 show that the Siberian gave an increase in yield per acre of about one bushel over the Sensation, and of three and one-half bushels over the Daubeney. The Siberian, as compared with the Sensation, also gave a larger yield of straw per acre, possessed a stiffer straw, and was more popular with the experimenters. According to the reports received from over the Province, the three most extensively grown varieties of oats in Ontario at the present time are the Banner, the Siberian and the Twentieth Century. It might be interesting to state that in connection with the Agricultural Societies of Ontario, in which prizes were offered for fields of standing grain in 1908, those varieties which secured thee greatest percentage of prizes were the Siberian and the Ligowa, fully three-fifths of all the entries in each variety receiving prizes.

Six-rowed Barley. The barley crop in Ontario has increased in market value from $4,812,194 to $12,900,689 during the past ten years, according to reports of the Ontario Bureau of Industries. In the same period, the area devoted to barley increased from 438,784 to 766,891 acres. The average annual yield of barley per acre for the last ten years has been fully one-fifth greater than that of the ten years previous. These large increases in areas and in yields per acre are undoubt-

edly due, to a considerable extent, to the introduction of the Mandscheuri variety by the Ontario Agricultural College, and to the distribution of the same through the medium of the Experimental Union.

One hundred and fourteen named varieties of barley have been grown in the Experimental department at the College for at least five years in succession, and some of them have been grown in each of twenty years. In the spring of 1889, one pound of the Mandscheuri barley, which was obtained from Russia, was sown on a small plot in the Experimental department to be tested with sixty other varieties. It produced comparatively stiff straw and gave a large yield of barley which was of good feeding quality, being fairly thin in the hull and plump in the grain. It has continued to give good results, the average for twenty-one years being 70.5 bushels of grain per acre in the experimental plots. Small quantities of the Mandscheuri barley have been distributed in each of the past sixteen years to those farmers who applied for the experiment with barley in connection with the Experimental Union. From these one pound lots so distributed, there are now about 570,000 acres of the Mandscheuri barley grown in Ontario annually. The introduction of this variety has had a wonderful influence on the barley production of this Province.

In the spring of 1903, 9,972 selected grains of the Mandscheuri barley were planted by hand at equal distances apart, in the Experimental department at the College. When the plants were ripe they were carefully examined, and thirty-three of the most promising ones were selected, harvested and threshed separately. In 1904, thirty-three separate lots of barley were grown from the plants selected in the year previous. From that time forward, only the best strains were grown in the tests as follows: Fourteen in 1905, eight in 1906, seven in 1907, three in 1908, and three in 1909. In one instance over forty bushels of barley were grown in 1905 as the product of one seed planted in the spring of 1903. Of all the selected strains, the one which is known as the O.A.C. Number 21 has made the best record. In each of the last three years it has actually given better results than the Mandscheuri variety in yield of grain, in freedom from rust, and in strength of straw in the co-operative experiments throughout Ontario. The grain is quite easily distinguished from that of the Mandscheuri barley.

We were able to trace several thousand bushels of this barley grown in Ontario in 1908 from the one pound lots of the O.A.C. Number 21 barley sent along with two other varieties to Experimental Union applicants in each of the two years previous. One farmer in Huron County harvested 900 bushels of the O.A.C. Number 21 barley in 1908, which was a third crop produced from one pound of seed sown in the spring of 1906. Farmers who have kept the barley pure had a large local demand for seed this spring from their neighboring farmers, and in some instances realized as high as $1.50 per bushel. It is quite probable that in a very short time the O.A.C. Number 21 barley will be grown more extensively than any other variety in Ontario. Not only do we receive excellent results from this barley in the co-operative experimental work, but we are also receiving most favorable reports from farmers who are now growing it as a field crop. From a large number of letters received last spring, there was not one but spoke very highly indeed of this barley, speaking particularly of its luxuriant growth, its stiffness of straw, and its power of giving high yields of grain.

Two-rowed Barley. It is only in a very few localities throughout the Province that the two-rowed barley is grown as a field crop. We find in our experimental work at the College that we obtain decidedly larger average yields per acre from the leading six-rowed than from the leading two-rowed varieties of barley.

From the average results of experiments over Ontario in 1909, it will be seen that the Hanna two-rowed barley made a very good showing indeed, but as there were only three successfully conducted experiments with the two-rowed barley, as compared with thirty of the six-rowed barley, it is hardly fair to make a close comparison between these two classes of grain. The Hanna two-rowed barley was also distributed throughout Ontario in 1908 and gave decidedly larger yields than the Two-rowed Canadian, in eight co-operative experiments of that year.

Hulless Barley. Some fourteen varieties of hulless barley have been under experiment at the College. These have been obtained from various countries of the world. The Black Hulless is the oldest and probably the best known variety in Ontario. It is, however, very weak in the straw and has not given as good results in yield of grain per acre as the Guy Mayle variety in the experimental work at the College. In each of the past two years the Guy Mayle has given decidedly better yields of grain per acre, has produced stiffer straw, and has been more popular with the experimenters than the old and well known Black Hulless variety.

Spring Wheat. Only two varieties of spring wheat were distributed in the spring of 1909. These represent two distinct classes or types. The Wild Goose is a durum wheat and is especially suitable for the production of macaroni, of cereal foods, or of flour for the use of blending with the flour of other varieties. The Red Fife is one of the finer grain wheats which produced flour of good color and of excellent quality. In the experiments at the College, the Wild Goose variety usually yields considerably more than the Red Fife. This generally holds true throughout Ontario in connection with the co-operative experiments. In the average results of twelve experiments conducted in 1909, the Wild Goose gave about three and one-half bushels per acre more than the Red Fife variety. It is probably quite safe to say that these two varieties are the most extensively grown of all kinds of spring wheat now under cultivation in the Province.

Buckwheat. The area devoted to buckwheat in Ontario has been gradually increasing from 88,266 acres in 1901 to 140,605 acres in 1908. In each of two years we have distributed the Silver Hull and the Rye buckwheat throughout Ontario for co-operative experiments. The average results show that the former was surpassed by the latter by 5½ bushels per acre in 1908 and by 3.3 bushels per acre in 1909. The Rye, Sand, or Notched buckwheat, although considerably grown in some countries, has not been used in the experiments at the College until within the last few years, during which time it has surpassed the Silver Hull considerably in yield of grain per acre. The Rye buckwheat is grown quite extensively in the Province of Nova Scotia.

Emmer and Spelt. Although these two classes of wheat have been grown for a very long period in some of the eastern countries, their cultivation in Canada is comparatively recent. They represent two classes of wheat which have been studied more particularly for the production of feed for farm stock than for the production of flour. When threshed, there is not a clear separation of the grain and the chaff, but both come from the machine together and are afterwards ground into meal. The Emmer usually possesses about 22 per cent. of hull or chaff and the Spelt about 30 per cent. It will therefore be seen that the amount of hull on the Emmer is considerably less than that on the average variety of oats, which usually runs about 30 per cent. Emmer and Spelt have been distributed throughout Ontario for co-operative experiments in each of the past six years, the following being the yields per acre from the two varieties respectively: 1904, 2,274 lbs., 1,263 lbs.; 1905, 1,589 lbs., 1,276 lbs.; 1906, 1,578 lbs., 1,106 lbs.; 1907, 1,768 lbs., 952 lbs.; 1908 1,731 lbs., 1,002 lbs.; and in 1909, 1,815 lbs., and 1,190 lbs. It will therefore be

seen that the Emmer has surpassed the Spelt in yield of grain per acre to a very marked extent. In both the experiments at the College, and also throughout Ontario, the Common Emmer forms a very close rival indeed to the best varieties of oats and the best varieties of barley in yield per acre; in fact Emmer has surpassed both of these grains on several occasions, of which 1909 is one.

Winter Wheat. Four varieties of winter wheat were distributed in the autumn of 1908 to those farmers who wished to test some of the leading varieties on their own farms. The Imperial Amber gave the greatest yield per acre in the co-operative yields throughout Ontario in 1907 and in 1908, as well as in 1909. It also came first in popularity with the experimenters in each of these years. In popularity there was not very much difference between the Imperial Amber and the Abundance varieties during the past year. The Dawson's Golden Chaff, which we distributed for co-operative experiments throughout Ontario in each of twelve years, has not been included in the co-operative tests since 1906. According to extensive inquiries which we have made this year, the Dawson's Golden Chaff is still the most popular and the most extensively grown variety of winter wheat in the Province.

Winter Rye. In the experiments throughout Ontario, the Mammoth White surpassed the Common rye by an average of five bushels per acre in 1907, 5.4 bushels per acre in 1908, and 6 bushels per acre in 1909. The Mammoth variety of winter rye is a very vigorous grower and has been very popular with the experimenters.

Field Peas. For three years we distributed no field peas throughout Ontario, except in those districts where the pea weevil had not yet been found. In each of the past four years, however, we have complied with practically all requests for peas for experimental purposes. We received for this experiment fifty-five good reports in 1906, forty-two good reports in 1907, fifty-three good reports in 1908, and forty-five good reports in 1909. We have compared the Early Britain and the Canadian Beauty varieties in our co-operative experiments throughout Ontario in each of seven years, and the average annual results show that in five of these years the Early Britain surpassed the Canadian Beauty variety in yield of grain per acre. In 1909, however, it will be seen that the Early Britain was surpassed by the New Canadian Beauty by about three-quarters of a bushel per acre. As the straw of the Canadian Beauty is longer than that of the Early Britain, and as the season of 1909 was rather unfavorable for the production of a large amount of straw, the last named variety did not do nearly as well as usual this season. The Canadian Beauty is a large, smooth, handsome pea which is very saleable. The peas of the Early Britain variety are of a brown color and are not as attractive as those of the Canadian Beauty variety. I am informed, however, by Mr. Murton, of Guelph, that the Early Britain is a very choice variety for the production of split peas, the grain being of a rich yellow color after the skin has been removed.

Field Beans. The area devoted to field beans in Ontario, although not extensive, comprises about 50,000 acres annually, and the market value of the crop usually amounts to more than a million dollars. Upwards of thirty varieties have been grown at the College, and three of the leading kinds were used in the co-operative experiments throughout Ontario in 1909. The tabulated results show that the highest yield this year was produced by the White Wonder with an average of 30 bushels per acre. It will also be noticed that, although the White Wonder surpassed both the Marrowfat and New Prize Winner in yield of grain per acre, it was not quite as popular with the experimenters as either of those varieties, as will be noticed under the column of comparative value in the tabulated results. This is probably owing to the fact that the White Wonder possesses rather a short

straw, and the weather conditions of the past season were more favorable for a longer strawed variety. Although the White Wonder gave a good yield of grain, the plants were undoubtedly rather short and would cause more inconvenience in harvesting.

Soy Beans. The past season has been very unfavorable for the growth of the soy beans in Ontario. Although seed of each of two varieties was distributed in the spring, no reports have been received which could be properly summarized for presentation in tabulated form. One man in Lambton County had a yield of 20 bushels of grain per acre of the Early Yellow variety in the past season, which was about five bushels per acre more than the yield obtained from the same variety at the College.

Corn for Grain. Fully one-half of the corn grown in Ontario is raised for the production of ripened grain. As the different varieties of corn vary so much in the time which they require to reach maturity, etc., many of them are quite unsatisfactory for grain production in the Province. Three comparatively early varieties were selected and distributed for the co-operative experiments in the spring of 1909. A number of experimenters reported the yields of the whole crop and of the husked ears, but there were just ten experimenters who conducted the experiment according to the directions in all details and furnished full and satisfactory reports. It will be seen from the foregoing table that the greatest yield was produced by the Genesee Valley, the second largest by the Compton's Early, and the lowest by the King Phillip. These are all flint varieties. The Genesee Valley is an eight-rowed yellow, the Compton's Early a twelve-rowed yellow, and the King Philip an eight-rowed reddish corn. The Genesee Valley was the most popular variety amongst the experimenters. According to the reports, the Genesee Valley and the King Phillip both ripened throughout the Province, but the Compton's Early reached only the firm dough condition, in the average of all the experiments. According to the reports received, the King Phillip grew to a height of three inches, and the Compton's Early to a height of six inches over the Genesee Valley. It will be seen that the corn produced a greater yield of grain than any of the other classes of grain crops under experiment in 1909.

Mixtures of Grain for Grain Production.

A large amount of experimental work has been carried on at the Agricultural College to determine the comparative values from growing grains in mixtures as against the growing of the same kinds of grain separately. A study has also been made of the various classes of varieties of grain, in order to ascertain which kinds can be mixed together with the best results for green fodder, for hay, and for grain production. For the details of these results, the reader is referred to the Annual Reports of the Ontario Agricultural College. For the production of grain, experiments show that when different classes of grain have been mixed together they have yielded more heavily in nearly all cases than when grown separately. Of the various classes used, the highest yield has been obtained from oats and barley. Of the different varieties which have been included in this experiment, the mixture of Mandscheuri barley and Daubeney oats has been one of the most satisfactory up to the present time. By means of cross-fertilization we are endeavoring to originate a variety of six-rowed barley at the College which will mature at about the same time as our leading varieties of oats, such as the Banner and the Siberian. In our efforts we are very much encouraged and believe that we have now secured a new hybrid barley which is comparatively stiff in the straw, a vigorous grower, a good yielder, and a variety which will mature about eight days later than the

Mandscheuri, and which will probably answer well for mixing with some of the leading varieties of oats. This new hybrid, however, is as yet only grown in our small plots and will probably not be ready for distribution in connection with the Experimental Union work until 1911 or 1912.

For five years in succession we have used three different mixtures of grain in order to compare the results of these mixtures throughout the Province, and in order to give the farmers a better opportunity to study the results of the same. The mixtures have been the same in each of the five years. The results of the experiment for 1909 are as follows:

Mixtures.	Comparative value.	Yield per acre.	
		Straw.	Grain.
		tons.	lbs.
Daubeney Oats.....34 lbs per acre Mandscheuri Barley.....48 "	100	1.11	1518
Siberian Oats.....25 " Two-rowed Canadian Barley.....35 " Wild Goose Spring Wheat.....22 "	58	1.05	1090
Siberian Oats.....34 " Two-rowed Canadian Barley.....48 "	74	.96	1037

It is interesting to know that the combination of Mandscheuri barley and Daubeney oats has given the greatest yield of grain per acre in each of the past five years. In 1909 this mixture gave a yield of more than 500 pounds of grain per acre more than either of the other two mixtures. In each of the five years the mixture of the Mandscheuri barley and the Daubeney oats has been decidedly the most popular with the experimenters. The area in Ontario which is being used for mixed grain is increasing from year to year, and we notice from the report of the Bureau of Industries for 1909 that there were no less than 474,530 acres devoted to mixed crops in the Province during that year.

Varieties of Potatoes.

We learn from the November report of the Census and Statistics office of the Department of Agriculture at Ottawa that in 1909 the area devoted to potato growing in Ontario was 26 per cent. greater than that of the Province of Quebec, and about equal to the combined areas used for the growing of potatoes in Nova Scotia, New Brunswick, Prince Edward Island, Manitoba, Saskatchewan and Alberta. We also learn that the estimated value of the potato crop grown in Ontario in 1909, as in 1908, was slightly over twelve million dollars. It will therefore be seen that the potato crop is an important one in this Province.

In connection with the co-operative experiments in 1909, the various experimenters were asked to furnish the names of those varieties which are most extensively grown in their counties. The following gives the names and the order of the varieties which were mentioned the greatest number of times: 1, Rural New Yorker No. 2; 2, Empire State; 3, Carman No. 1; 4, Beauty of Hebron; 5, Early Rose; 6, Delaware; 7, American Wonder; 8, White Elephant; 9, Early Ohio; 10, Carman No. 2; 11, Irish Cobbler; and 12, Sir Walter Raleigh. From inquiries made in each of the past three years, the Rural New Yorker No. 2 has been mentioned first and the Empire State second each time as being the varieties which are the most extensively grown throughout the Province. In 1907, the American Wonder was mentioned as third, and in 1908 the White Elephant as third, and in 1909, the Carman No. 1 as third. These are both white potatoes which yield well and are of good quality. If the farmers of Ontario would select a few of the very

best varieties of potatoes and grow those varieties almost exclusively for their general crop, the products would be more uniform and better prices would be realized.

In the spring of 1909, the Experimental Union distributed two varieties of late, two varieties of medium ripening, and five varieties of early potatoes for experimental purposes. Only two varieties were sent to each experimenter, but in each group of potatoes one variety was distributed throughout and used as a basis of comparison in summarizing the results. A very large number of applications were received in the spring of the year and many valuable reports of successfully conducted experiments reached the College this autumn.

Table II. gives the average results of the co-operative experiments with varieties of potatoes conducted on about four hundred farms throughout Ontario in 1909.

TABLE II.—POTATO EXPERIMENTS.

Experiments.	Potatoes.	Comparative Value.	Per cent. of small Tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late Varieties ..... (73 tests)	Empire State.....	100	11	100	177.73
	Dempsey's Seedling.....	85	12	93	154.88
Medium Varieties ... (96 tests)	Burpee's Extra Early.....	100	10	100	193.60
	Rose of the North.....	92	11	92	192.03
Early Varieties ..... (220 tests)	Extra Early Eureka	100	11	89	181.46
	Early Puritan	88	13	100	155.67
	Early Fortune	80	12	89	151.00
	Early Andes	86	11	95	126.35
	Early Ohio.....	78	12	86	122.18

The tabulated results show that of the average of seventy-three experiments, the Empire State gave practically 23 bushels of potatoes per acre more than the Dempsey's Seedling variety. The Empire State also surpassed the Dempsey's Seedling in mealiness and in popularity with the experimenters. It is quite probable that both of the late varieties of potatoes would have produced larger yields per acre in 1909 had it not been for the cold, backward spring and the early autumn frost, which occurred in some localities about the end of August, and in some instances froze the potato tops while they were still green. The Empire State potatoes not only give a good yield per acre, but they are of excellent quality, and owing to their good shape and white color, sell more rapidly on the market than some of the other varieties.

Of the two varieties of medium ripening potatoes tested over Ontario during the past year, the Burpee's Extra Early has taken the highest place in yield per acre as it did in each of the past two years. The potatoes were also of a little better quality and were more popular with the experimenters than those of the Rose of the North variety.

Two hundred and twenty good reports of successfully conducted experiments with early potatoes were received. The Extra Early Eureka, which occupied the highest place in 1907 and the second highest place in 1908, again comes to the top of the list in 1909 with an average yield of 181 bushels per acre. The Extra Early Eureka potatoes are roundish in form and of a white color and are very popular with the experimenters. The Early Fortune variety has occupied third place in yield per acre in the co-operative experiments with the early varieties for three years in succession. The Early Ohio variety, which is one of the best known and one of the most extensively grown early potatoes in Ontario at the present time,

occupies the lowest place in yield per acre in 1909, the yield being nearly 60 bushels per acre less than that of the Extra Early Eureka.

Taking the results of the co-operative experiments both for this year and for other years into consideration, we wish to draw attention particularly to the most excellent results which have been obtained from the Empire State of the late, the Burpee's Extra Early of the medium, and the Extra Early Eureka of the early varieties.

Sweet Corn for Home Use.

There is a great variation in the different varieties of sweet corn in stage of maturity, in the size and the color of the ears, the flavor and the juiciness of the grain, etc. In order to get fuller information on these points, upwards of fifty varieties of sweet corn have been grown and their table quality tested at the Agricultural College. A few of the choice varieties have been selected for co-operative experimental work. In the spring of 1909, three varieties were distributed for testing throughout Ontario. Table III. presents the average results of twenty-four co-operative experiments with the three varieties of sweet corn for the past season.

Table III.—Sweet Corn.

Experiment.	Varieties.	Comparative Value.	Number of Ears.	Number of days until ready for table use.	Table Quality.	
					Flavor.	Juiciness.
Sweet Corn..... (24 tests)	Golden Bantam.....	100	150	86	100	100
	Mammoth White Cory.	74	147	87	69	71
	Malakhoff.....	45	136	85	56	65

Of all the varieties of sweet corn which have been tested at the Ontario Agricultural College, the Golden Bantam is the favorite variety for the table. The seed of this variety was first introduced and tested by the College about seven years ago. The ears are rather small, yellow in color, and possess eight rows. The corn is exceedingly tender and possesses an excellent flavor. In the co-operative experiments over Ontario in 1907 and again in 1908, the Golden Bantam was reported by the experimenters as possessing the best table quality and as being the choice of the varieties tested for home use. It will be seen from the foregoing table that it has also made an excellent record in 1909, occupying the highest place in both flavor and juiciness and also in popularity, when all points were taken into consideration. The Malakhoff variety of sweet corn was introduced from Russia into the United States through the Department of Agriculture at Washington and has been tested at a number of the experiment stations. It has been grown at the Ontario Agricultural College in each of the past six years and was distributed for co-operative experimental work throughout Ontario in 1908 and in 1909. The Mammoth White Cory has been grown in Ontario for a number of years, and is one of the best known early varieties of sweet corn in the Province.

Field Roots, Fodder Plants and Hay Crops.

The co-operative experiments included under this heading in 1909 were with mangels, sugar beets for feeeding purposes, swede turnips, fall turnips, carrots, fodder corn, sorghum, millet, grass peas, vetches, rape, kale, field cabbage, clover, Lu-

cerne and grasses. The average results of the carefully conducted experiments with the most of these crops are here presented in tabulated form. It has been a difficult matter, however, to get full and accurate results from the experiments with grasses and clovers to present in this way. Table IV. is very interesting and furnishes good data. It should be of considerable importance, as there are no other places where results of similar comparisons can be obtained.

TABLE IV.—FIELD ROOTS AND FODDER CROPS.

Experiments.	Varieties.	Comparative value.	Yield per Acre. (Tons).
Mangels (7 tests)	Ferry's Yellow Leviathan	100	31.51
	Ideal	72	30.50
	Sutton's Mammoth Long Red	61	28.93
Sugar Beets (7 tests)	Rennie's Tankard Cream	100	24.95
	Bruce's Giant White Feeding	95	24.67
Swede Turnips (3 tests)	Carter's Invicta	97	25.25
	Steel-Briggs' Good Luck	100	25.00
	Sutton's Magnum Bonum	97	21.71
Fall Turnips (3 tests)	Red Top White Globe	88	29.45
	White Egg	100	28.00
Carrots (8 tests)	Steel-Briggs' Improved Short White	94	21.90
	Bruce's Mammoth Intermediate Smooth White	100	20.09
Fodder Corn (8 tests)	Henderson's Eureka	100	18.19
	White Cap Yellow Dent	94	12.63
	Sterling White Dent	78	12.48
Sorghum (4 tests)	Early Amber Sugar Cane	100	6.23
	Early Minnesota Sugar Cane	100	6.15
Grass Peas and Vetches. (4 tests)	Hairy Vetches	100	8.30
	Common Vetches	71	6.85
	Grass Peas	86	6.73
Rape, Kale and Cabbage. (4 tests)	Sutton's Earliest Drumhead Cabbage	100	16.76
	Dwarf Essex Rape	94	12.85
	Thousand-headed Kale	63	11.54

Mangels.—It should be stated in the beginning that the three varieties of mangels included in the co-operative experiments in 1909 represent three distinct types of roots, viz., the Long Red, the Intermediate and the Tankard. There has been an impression abroad that the Long Red mangel nearly always was capable of producing a larger yield of roots per acre than either of the other two classes here mentioned. In our experiments at Guelph during the past few years, we have found that some of the heaviest yielders of roots have belonged to the Intermediate and the Tankard classes. The College Report for 1908 shows that the Yellow Leviathan, which is an Intermediate in form and in length, and the Griewener variety, which is Tankard in form, occupied the highest place in average yield per acre of all the varieties grown for five years in succession. It will be seen from the accompanying table that the Yellow Leviathan also occupies the highest place in the co-operative

experiments throughout Ontario for 1909. This was followed by the Ideal, which is a mangel of Tankard form, and which produced on an average one ton per acre less than the Yellow Leviathan. The Sutton's Mammoth Long Red, which is one of the best yielding long red mangels which has been grown at the College, came at the bottom of the list in average yield per acre in the co-operative experiments throughout Ontario in 1909, being surpassed by the Yellow Leviathan by about two and a half tons of roots per acre. The Yellow Leviathan has also given very excellent results in the co-operative experiments in past years. Not only does it give a large yield of roots per acre, but it has a compact form with but a few fibrous roots, and is of good keeping and feeding quality.

Sugar Beets for Feeding Purposes. Those varieties of sugar beets most suitable for feeding purposes, as well as those particularly suitable for the production of sugar, have been tested at the College for a number of years, and the roots of each variety have been analysed in at least five different seasons.

Those varieties grown for sugar production, produce roots which are comparatively small, which grow almost entirely under the ground and which give an average of about 15 per cent. of sugar while those varieties which are grown for feeding purposes, give a larger yield of roots per acre, grow more out of the ground, and are thus more easily handled and produce roots which have about two-thirds the sugar content as compared with the other class. The two varieties of sugar beets for feeding purposes which were distributed in the spring of 1909 were the Rennie's Tankard Cream and the Bruce's Giant White Feeding, the varieties being the same as in 1908. The results show that in each of these years there were seven successfully conducted experiments, and that the Rennie's Tankard Cream gave the largest average yield of roots per acre, although the difference was not very great in either year. According to the chemical analyses at the College, the Giant White Feeding has given an average of 7.8 per cent. sugar in the average of six years, and the Tankard Cream of 8.9 per cent. sugar in the average of five years.

Swede Turnips. The yield of turnips per acre was slightly larger in 1909 than in 1908. The Carter's Invicta and the Steele Briggs Good Luck varieties both produce roots of good form which are very suitable, not only for home use, but also for shipping to New York, Boston and other American markets to be used for domestic purposes.

Fall Turnips. The fall or soft turnips usually give large yields of roots per acre, but do not keep so well into the winter as the Swedish varieties. The Red Top White Globe again heads the list in the co-operative experiments in yield per acre throughout Ontario, although the White Egg variety was somewhat more popular with the experimenters.

Field Carrots. The old White Belgian has been almost entirely supplanted by the Intermediate White varieties, which produced larger yields per acre and are more easily harvested. The Steele-Briggs Improved Short White variety surpassed the Bruce's Mammoth Intermediate Smooth White carrot in the average of eight comparative tests throughout Ontario in 1909 by nearly two tons per acre.

Fodder Corn. The Henderson's Eureka variety of corn has been a very heavy yielder of fodder in the experiments at the College. It is one of the very best of the large late varieties of fodder corn which has been under experiment. The White Cap Yellow Dent is an earlier variety than the Eureka and is more suitable for the greater portion of the central part of Ontario. The Sterling White Dent is one of the very earliest varieties of dent corn of all those which have been grown at the College in past years. It has been specially bred as a suitable corn

for northern districts, and amongst the very early varieties it is one of the most promising. Although the comparative results of the co-operative experiments show that the Henderson's Eureka occupies the highest, and the Sterling White Dent the lowest yields per acre, it must be considered that the Henderson's Eureka is only suitable on some of the very warmest soils in the extreme southern part of Ontario, and that the Sterling White Dent can be grown with satisfaction in those parts farther north in the Province than nearly all of the other varieties of dent corn.

Sorghum. A considerable number of sorghums, including different varieties of sugar cane, broom corn, kaffir corn, milo maize, Jerusalem corn, etc., have been grown at the College for several years in succession. Some of these, and especially the sugar canes, have given good results. In some localities throughout Ontario, sugar cane has been grown with a considerable amount of satisfaction as a fodder crop. The co-operative results over Ontario show exceedingly light yields for the sugar cane in 1909. The yields are very much lower than usual. In some localities, the sugar cane forms a close rival to the varieties of corn, under general cultivation.

Millet. The season of 1909 was very unfavorable for the growth of millet. Although three varieties were distributed in the spring for co-operative experiments, no full and satisfactory reports of successfully conducted experiments have been received.

Grass Peas and Vetches. The Hairy vetches gave an average yield of green crop per acre in the experiments throughout Ontario of 8.3 tons in 1909, 12.2 tons in 1908, 9.2 tons in 1907, 7.9 tons in 1906, 8.9 tons in 1905, and 5 tons in 1904. It will therefore be seen that the results for 1909 are not very different from the average of the past five or six years. The Hairy vetches, Common vetches, and Grass Peas have been tested over Ontario for a number of years under uniform conditions. The average results show that the Hairy vetches gave the greatest yield of green crop per acre. Much has been said regarding the growing of Hairy vetches in the United States and in Canada, but owing to the fact that the seed usually costs from five to six dollars per bushel, and that it requires from one to one and one-half bushels of seed to sow an acre, it is doubtful if the Hairy vetches will become extensively grown as a fodder crop in Ontario, unless seed can be obtained at a less cost per bushel. In some seasons very good results indeed can be obtained from growing the Hairy vetches for seed production in this Province, but at the present time nearly all of the seed is imported from European countries. Grass Peas make a very good fodder crop, and can sometimes be used for this purpose to advantage.

Autumn Sown Hairy Vetches and Winter Rye. In each of six years, the seed of Hairy vetches and Winter rye has been distributed throughout Ontario for co-operative experiments in testing these crops for fodder purposes. In the average of six years' experiments, the Hairy vetches produced slightly the larger yield of green fodder per acre, but in 1909 the larger yield was produced by the Winter Rye.

Rape, Kale and Field Cabbage. For six years in succession, twenty-five varieties of rape, kale, field cabbage, Brussels sprouts, etc., have been grown in the Experimental Department at the College. In these results, the Sutton's Earliest Drumhead cabbage has given the highest average yield of green crop per acre, when the seed was sown and treated in exactly the same way as that of rape. In each of the past two years, the Sutton's Earliest Drumhead cabbage has been incorporated in the work of the Experimental Union. The demand for the seed of the cabbage, kale,

and rape was very limited each year, but the results of the two good reports of successfully conducted experiments in 1908 and of the four in 1909 show that the field cabbage gave a yield considerably higher than either the rape or the kale. Especially was this true in 1909, the yield from the cabbage being about one-third larger than that from Dwarf Essex rape.

Clovers. Three varieties of clover, viz., the Common Red, the Alsike, and the Mammoth Red have been distributed each year for some time past. As the Common Red usually produces two crops in the one year, and each of the others one crop per season, and as the Common Red is not apt to survive the second winter as well as the Mammoth Red, it is difficult to get accurate results which will form a good summary report. These experiments, however, are of considerable value to the experimenters, but the results do not form data which can be presented very satisfactorily in a concise tabulated statement, hence no summary has been given in this report.

Alfalfa or Lucerne. In growing Alfalfa at the College in each of twelve years, from 1896 to 1909, the average yield of green crop per acre has been about 21 tons, and the yield of cured hay per acre fully 5 tons. There has been an average of three cuttings per annum, or of thirty-six cuttings during the twelve years. Our co-operative work of the past shows that Alfalfa can be grown successfully on many of the farms of Ontario where the land is suitable, but it should always be remembered that Alfalfa requires land with a subsoil which is well underdrained, either naturally or artifically. Alfalfa seed, obtained from Turkestan, and also from the Panhandle, Texas, have produced strains which have given very good results indeed in the experiments at Guelph. The seed of both the Turkestan and the Common Alfalfa was distributed for co-operative experiments in the spring of 1908. In the spring of the present year, these two strains were sent to some of the experimenters, and seed of both the Panhandle and the Common varieties was distributed to others. We hope another year to be able to present some valuable reports on these different strains of Alfalfa as grown on different farms throughout the Province.

Grasses. The varieties of grasses which have been distributed during the last few years are the Tall Oat, Orchard Grass, Tall Fescue, Western Rye, Lyme Grass, and Timothy. The Tall Oat has usually produced a very early crop and a large yield of hay, but it is difficult to secure satisfactory returns for presenting in a concise tabulated statement. Experiments with the grasses, however, form some excellent object lessons, and supply valuable information to those who conduct the experiments and to others who have an opportunity of seeing the growing crops. These various experiments form centres of observation and most valuable object lessons in various parts of the Province, and we earnestly believe that they exert a most wholesome influence in various ways.

Fertilizers with Farm Crops.

Any person who has had much to do in conducting experiments on field plots will, undoubtedly, realize the great difficulty in conducting tests of fertilizers with farm crops and obtaining as full information as he would desire on the subject. Much has been done in laboratory work in analyzing plants, soils and fertilizers, in the search for knowledge regarding the contents of the soil, the requirements of the plants, and the suitability of the fertilizers to meet all these needs. When the fertilizers are applied to the soil, however, they do not always work according to the conclusions of the chemist, drawn from his work in the laboratory. Not only do the crops vary largely in the amount of plant food which they contain, but the power of the different soils in giving up their plant food, and of the plants of

making use of the same, also varies greatly. The fertilizers themselves also vary to a marked degree in both the amount and the availability of plant food which they contain. Amongst those institutions which have done a large amount of work in the application and study of fertilizers to the soil for different crops, might be mentioned the Rothamsted Experiment Station in England, the Experiment Station of the Royal Agricultural Society at Woburn, England, and the State Experiment Stations at New Brunswick, New Jersey, and at Wooster, Ohio. The work at these institutions, which has continued for many years and at great expense, supplies results which are valuable in furnishing certain information. The information obtained from these institutions, however, is limited in its application, and it seems practically necessary for each farmer to do a certain amount of experimental work of his own in securing information which experiments at other institutions cannot supply. If, however, elaborate experiments with fertilizers are planned for farmers to conduct, they will, in most instances find the work and the expense beyond their reach. Realizing this fact, some comparatively simple experiments were arranged in connection with the Experimental Union, seventeen years ago. While it is true that these experiments have not accomplished all that we would like to have fertilizer experiments accomplish, the same can be said regarding every fertilizer experiment on field plots which has ever been conducted in any country. The table gives a summary of nearly all of the experiments conducted through the medium of the Experimental Union, within the past seventeen years, including the tests of fertilizers in 1909 with turnips for the fourth year and with potatoes for the third year.

In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre, and the superphosphate at the rate of 320 pounds per acre. The mixture of complete fertilizer has been composed of one-third the amount of these fertilizers, making in all 213⅓ pounds. Both the Royal Canadian and the potato fertilizer used in 1909 with the potato crop, were applied at the rate of 320 pounds each per acre. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and all the other fertilizers at the time of sowing the seed. Farmyard manure has been used in the experiments of the past seven years. The advice to each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

Table V. gives the chemical composition of the commercial fertilizers used in the co-operative experiments in 1909, as determined in the Chemical department at the College:

TABLE V.—COMPOSITION OF THE FERTILIZERS USED IN THE EXPERIMENTS IN 1909.

Fertilizer.	Percentage of Fertilizing Constituent.		
	Nitrogen.	Potash.	Phosphoric Acid.
Nitrate of Soda	15.67		
Muriate of Potash		50.9	
Superphosphate			15.36
Complete Fertilizer	3.92	12 73	7.68
Potato Fertilizer	3.19	6.30	9.25
Royal Canadian	3.83	10.15	5.38

Table VI. presents the average results of the co-operative experiments with fertilizers on different kinds of farm crops. For a detailed statement of the results of fertilizers with potatoes the reader is referred to Table VII.:

TABLE VI.—AVERAGE RESULTS OF FERTILIZER EXPERIMENTS.

Kind of Fertilizer Used.	Fertilizer per acre.		Average yield per acre. Oats.	Winter Wheat.	Fodder Corn		Mangels.	Swede Turnips.	Potatoes.
					Total.	Ears.			
	Weight.	Cost.	5 years 74 tests.	5 years 15 tests.	8 years 47 tests.	8 years 41 tests.	5 years 41 tests.	4 years 16 tests.	3 years 64 tests.
	Lbs.	$ c.	Bus.	Bus.	Tons.	Tons.	Tons.	Tons.	Bus.
Nothing	.....	.....	38.9	19.9	8.2	2.7	20.6	20.9	142.8
Nitrate of Soda	160	4.80	46.3	23.8	9.4	3.1	26.5	24.0	168.6
Muriate of Potash	160	4.00	43.8	22.9	9.4	3.0	24.6	24.7	176.5
Superphosphate	320	3.92	43.6	22.7	9.0	3.1	24.2	26.1	174.9
Complete Fertilizer	213	4.24	48.7	25.2	9.4	3.2	25.4	26.8	183.6
Potato Fertilizer	320	5.52	.....	.....	.....	.....	.....	.....	182.7
Royal Canadian	320	5.60	.....	.....	.....	.....	.....	.....	179.2
Cow Manure	40,000	6.00	.....	27.1	.....	.....	.....	29.0	191.1

In connection with the co-operative work, experiments have been conducted throughout Ontario with fertilizers on oats for five years, winter wheat for five years, fodder corn for eight years, mangels for five years, Swede turnips for four years, and potatoes for three years. The reports for 1909 are confined to the experiments with fertilizers with Swede turnips and with potatoes.

The cost of each fertilizer, as given in the table, represents very closely the present cost per acre for the fertilizers as used in the co-operative experiments. The quotations were based on the factory prices for quantities of one ton in each case. The twenty tons of cow manure would mean about twelve good sized loads per acre, and manure in Guelph has been selling at 50 cents per load, which is probably about the average for the Province. It is exceedingly difficult to place a price on farmyard manure, as in most cases it is not purchased, but is produced on the farm. Each person may place such value on the manure as he deems expedient, and study the results according to his own circumstances. It should be remembered that the freight on the fertilizers and the application of both the fertilizers and the manure are not taken into consideration in the foregoing statement, nor yet is there any account made of the future influence of the different fertilizers and the manure upon the land.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest average yield was obtained from the unfertilized land, 38.9 bushels per acre; and the highest average yields from the mixed fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed or complete fertilizer gave the largest yield of oats per acre in the average results of this experiment in each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase

was produced at a cost of about 42 cents per bushel, according to the present prices of fertilizers. It will, therefore, be seen that it is only in special years that these commercial fertilizers will give economical results with oats on the average land of Ontario. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soil by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Fertilizers with Winter Wheat. In the co-operative experiments with different fertilizers applied to winter wheat, it will be seen that the greatest average yield per acre was produced from the application of cow manure. The complete fertilizer, however, when applied at the rate of only 213 pounds per acre, gave less than two bushels per acre below the cow manure. It will be observed that the land which received the complete fertilizer gave 5.3 bushels per acre more than that which received no fertilizer. According to the prices of fertilizers given in the table, the most economical increase in yield of winter wheat was made by the application of the mixed fertilizer, and even in this case the cost of the increased yield amounted to 82 cents per bushel.

Fertilizers with Corn. In the average of experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yields of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and mixed fertilizer, were equal, while a plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained when the mixed fertilizer was applied to the land. The muriate of potash produced the corn at the least cost per ton, but even with this fertilizer it cost $3.33 on the average to produce each additional ton of fodder corn.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, viz., 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, viz., 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre, produced by the nitrate of soda over the unfertilized land, was obtained at a cost of about 2.4 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the sandy land which was fertilized at the rate of 160 pounds of nitrate of soda per acre gave an average yield of 7⅔ tons per acre more than the land which was unfertilized.

Fertilizers with Swede Turnips. From the average results of the four years' experiments with fertilizers and Swede turnips, it will be seen that farmyard manure has given the largest, the complete fertilizer the second largest and the superphosphate the third largest yield of roots per acre. According to the prices given for the manure and the fertilizers in the foregoing table, the increased yield of turnips was produced at a cost of 62 cents per ton by the use of cow manure, and 72 cents per ton or 2.2 cents per bushel by the use of the complete fertilizer.

TABLE VII.—RESULTS OF EXPERIMENTS OF FERTILIZERS WITH POTATOES IN EACH OF THE YEARS 1907, 1908 AND 1909.

County.	Soil.	Bushels of Potatoes per Acre.							
		No Fertilizer.	Nitrate of Soda.	Muriate of Potash.	Superphosphate.	Complete Fertilizer.	Potato Fertilizer.	Royal Canadian.	Cow Manure.
1907.									
Lincoln	Sandy Loam	124.7	122.7	138.7	137.4	128.0	153.4	139.4	137.4
Nipissing	Clay Loam	125.4	152.0	156,0	149.4	182.7	165.4	160.0	189.4
Nipissing	Clay Loam	226.7	226.7	290.7	346.7	240.0	366.7	293.4	333.4
Parry Sound	Sandy Loam	85.4	94.7	114.7	120.0	137.4	109.4	134.7	133.4
Parry Sound	Clay Loam	161.4	288.0	245.4	229.4	300.0	202.7	245.4	340.0
Rainy River	Black Loam	100.0	170.7	170.7	202.7	270.7	233.4	128.0	169.4
Waterloo	Clay Loam	108.0	129.4	153.4	138.7	113.4	133.4	154.7	128.0
Middlesex	Sandy Loam	98.7	98.7	121.4	96.4	106.7	114.0	115.4	128.0
Essex	Light Sand	97.4	120.0	113.4	158.7	92.0	94.7	106.7	93.4
Thunder Bay	Clay Loam	160.0	200.0	170.7	186.7	209.4	166.7	213.4	157.4
Haldimand	Heavy	89.4	130.7	120.0	136.0	113.4	120.0	110.7	193.4
Lambton	Clay	69.4	120.0	157.4	104.0	130.7	109.4	101.4	93.4
Haldimand	Clay Loam	74.7	106.7	94.7	78.7	93.4	82.7	89.4	93.4
Simcoe		60.0	58 7	89.4	165.4	124.0	141.4	137 4	280.0
Huron	Clay Loam	70 7	77.4	70.7	101.4	80 0	78.7	74.7	96.0
Elgin	Sandy Loam	130.7	179.4	178.0	152.0	200.7	202.0	169.4	174.0
Parry Sound	Clay Loam	276.0	400.0	394.7	390.7	396.0	328.0	382.7	380.0
Oxford	Clay Loam	74.7	66.7	84.0	81.4	85.4	80.0	74.7	89.4
Welland	Black Sand	64.0	52.0	100.0	93.4	85.4	124.0	80.0	100.0
Leeds	Sandy Loam	50.7	76.0	65.4	68.0	70.7	58.7	81.4	68.0
Kent	Clay Loam	46.7	58.7	45.4	101.4	78.7	112.0	110.7	68.0
Thunder Bay	Clay Loam	64.0	120.0	101.4	80.0	125.4	104.0	176.0	48.0
1908.									
Kent	Sandy Loam	293.4	346.7	384.0	276.0	360.0	310.7	317.4	278 7
Elgin	Sandy Loam	130.7	133.4	130.7	125.4	148.0	174.7	153.4	198.7
Lincoln	Sandy Loam	402.7	394.7	394.7	398.7	466.7	408.0	412.0	470.7
Lincoln	Heavy Sand	151 4	169.4	176.0	144.0	170.0	180.0	183.4	169.4
Oxford	Clay Loam	301.4	320.0	360.0	373.4	358.7	412.0	392.0	345.4
Lambton	Clay Loam	122.7	126.7	160.0	142.7	129.3	142.7	138.7	153.3
Elgin	Clay Loam	112.0	133.3	150.7	133.3	156.0	120.0	134.7	137.3
Grey	Clay Loam	76.0	131.3	101.3	188.7	167.0	200.7	178.3	285.3
Oxford	Sandy	160.0	170.0	224.0	173.3	311.3	149.3	177 3	200.7
Norfolk	Sandy Loam	108 0	116.0	137.3	130.7	132.0	128.0	146.7	154.7
Bruce	Sandy Loam	144.7	166.7	176.7	191.3	162.0	203.3	200.0	220.7
Ontario	Sandy Loam	42.7	93 3	66.7	72.0	82.7	118.7	46.7	66.7
Bruce	Gravelly Loam	165.3	188.7	194.0	234.7	193.3	189.3	224.0	181.3
Muskoka	Sandy	90.7	169.3	112.0	173.3	153.3	197 3	136.0	210.7
Northumberland	Clay Loam	154.7	186.7	233.3	166.7	213 3	166.7	170.7	233.3
Bruce	Sandy	128.0	156.0	136.0	138.7	137.3	160.0	138 7	158.7
1909.									
Waterloo	Light Loam	169.3	206.7	220.0	200.0	173.3	220.0	240.0	200.0
Leeds	Black Muck	186.7	213.3	266.7	238.7	266.7	277 3	280.0	306.7
Muskoka	Gravelly Loam	73.3	100.0	126.7	112.0	116.0	97.3	152.0	154.7
Leeds	Sandy Loam	358.7	350.7	342.7	353.3	356.0	388.0	358.7	418.7
Haldimand	Clay Loam	112.0	132.0	120.0	106.7	112.0	162.7	170.7	185.3
Wellington	Clay Loam	146.7	174.7	200.0	200.0	194 7	188.0	173.3	157.3
Elgin	Sandy Loam	120.0	146.7	157 3	152 0	166.7	162.7	157.3	160.0
Lambton	Clay Loam	217 3	222.7	230.7	226.7	214.7	226 7	216.0	240.0
Norfolk	Sandy Loam	122.0	141.3	194 7	184.0	157.3	170.7	173.3	165.3
Simcoe	Clay Loam	246.7	277.3	278.7	328.0	365.3	300.0	326.7	274.7
Simcoe	Sandy Loam	173.3	164.0	270.7	224.0	178.7	257.3	173.3	261.3
Waterloo	Clay Loam	55.3	97.3	111.3	108.7	89.3	86.0	103.3	69.3
Norfolk	Sandy	98.7	97.3	82 7	100.0	80.0	80.0	105.3	97.3
Kent	Clay Loam	152.0	162.3	162.7	142.7	179.3	143 3	165.3	157.3

TABLE VII.—Concluded.

County.	Soil.	Bushels of Potatoes per Acre.							
		No Fertilizer.	Nitrate of Soda.	Muriate of Potash.	Superphosphate.	Complete Fertilizer.	Potato Fertilizer.	Ropal Canadian.	Cow Manure.
1909—Concluded.									
Northumberland	Clay	340.0	413.3	404.0	366.7	453.3	386.7	349.3	349.3
Middlesex	Sandy	50.7	80.0	120.0	93.3	80.0	86.7	94.7	97.3
Muskoka	Sandy Loam	88.0	94.7	93.3	141.3	98.0	129.3	85 3	120.0
Elgin	Sandy	95.3	91.3	132.0	119.3	126.7	142.7	136.7	129.3
Dundas	Heavy Clay	249.3	289.3	282.7	264.0	320.0	297.3	262.7	280.0
Nipissing	Clay Loam	159.3	165.3	154.7	194.0	182.7	260.0	190.7	239.3
Dundas	Clay	208.0	225.3	226.7	200.0	197.3	217.3	220.0	237.3
Dundas	Clay Loam	166.7	213.3	168.0	168.0	186.7	193.3	208.0	200.0
York	Clay	82.7	82.7	70.0	106.7	119.3	99.3	91 3	105.3
Oxford	Sandy	84.0	94.7	96.0	92.0	100.0	81.3	90.7	93.3
Carleton	Loam	204.0	217.3	206.0	230.0	228.7	231.3	278.0	237.3
Oxford	Sandy	192.0	216.0	202.7	209.3	176.0	186.7	181.3	244.0

Fertilizers with Potatoes. In the experimental grounds at the Ontario Agricultural College, thirteen different kinds of fertilizers were used with potatoes for five years in succession. The average results with that experiment showed that the Royal Canadian fertilizer gave the highest, and the Potato fertilizer the second highest yield of tubers per acre. Based on this experiment, another was arranged and was also conducted for five years in succession, and the results show that the highest average yield of potatoes was obtained from the use of a mixed fertilizer, similar to the one used in connection with our co-operative work with other crops. This, however, was closely followed in yield by the Royal Canadian and by the Potato fertilizer. The last two are both complete fertilizers, each containing nitrogen, phosphoric acid, and potash. The Royal Canadian fertilizer is sold by the Capelton Chemical Co., Buckingham, Que., and the Potato fertilizer by the W. A. Freeman Co., Hamilton, Ont. In the spring of each of the past three years, both potatoes and fertilizers were distributed from the College to applicants throughout Ontario. From these experiments, reports of successfully conducted tests were received from twenty-two experimenters in 1907, sixteen in 1908, and twenty-six in 1909. The average results of the three years' tests are here presented in tabulated form. It might here be stated that the comparative results of the different fertilizers were quite similar in the three years. It will be seen from the summary table that of the commercial fertilizers, the three complete manures gave the highest results, and of these, the mixture composed of 53 pounds of nitrate of soda, 53 pounds of muriate of potash and 107 pounds of superphosphate gave a higher yield per acre than either the potato fertilizer or the Royal Canadian, each of which was applied at the rate of 320 pounds per acre. The highest yield of all in each of the past three years was produced by an application of cow manure at the rate of twenty tons per acre. The land thus treated gave an average of 48.3 bushels per acre more than the land which was unfertilized.

In accord with the prices given for the manure and the fertilizers in the foregoing table, the increased yield of potatoes was produced at a cost per bushel for

complete fertilizer, 10.4 cts.; muriate of potash, 11.9 cts.; superphosphate, 12.2 cts.; cow manure, 12.4 cts.; potato fertilizer, 13.8 cts.; Royal Canadian fertilizer, 15.4 cts.; and nitrate of soda, 18.6 cts.

In each of the past three years, the majority of the experimenters tested the potatoes grown from all the fertilizers, and reported the results for both flavor and mealiness. It was found that the table quality was influenced but very slightly indeed by the fertilizers. In 1909, the potatoes were practically free from scab, except those which were grown with the cow manure, which, in some cases, were affected slightly. There was practically no rot during the past season. What little trace there was seemed to be more noticeable in the potatoes which received the cow manure, than those which had been treated with commercial fertilizers.

In 1909, of the experiments here reported, twelve were conducted on light soil and twelve on heavy soil. The average results from the two kinds of soil show the largest yields per acre on light soils from cow manure, muriate of potash and potato fertilizer, and from the heavy soils from complete fertilizer, potato fertilizer and cow manure. Taking all the experiments of the last three years into consideration, the cow manure has given high results on both the light and the heavy soils, and the potato fertilizer has shown up particularly well on the light lands. It should be stated that, in some individual cases, certain fertilizers gave a yield fully double that obtained from the land which was left unfertilized, while in other instances, the influence from the various fertilizers was comparatively small.

A MEMBER: Where does the American Banner oat come in?

PROF. ZAVITZ: The Siberian stands higher than the American Banner in our own experiments conducted at the College during the past five years, although a short time ago American Banner was the highest.

A MEMBER: Are you able to tell why Daubeney has made a low score in comparative value?

PROF. ZAVITZ: It has not yielded quite as well over Ontario this last year. Daubeney and Alaska are two of the very best of the early oats.

PRESIDENT CREELMAN: According to your report, the yield in winter wheat is very low this year. You have not more than the average of the Province. Surely your experimenters are better men than the average farmer.

PROF. ZAVITZ: The average of these twenty-one reports shows about three bushels more than the average yield of the Province for winter wheat for the last few years, but not much higher than this year. The average in the Province this year was twenty-four bushels per acre. We should remember that we have been doing a great deal with Dawson's Golden Chaff. It is the farmers' wheat. It is very stiff in the straw and a large yielder. Millers thought we were doing too much with Dawson's Golden Chaff, and we have not sent it out during the last few years, but it is decidedly the most popular, and it is grown the most extensively and I believe that if we had included the Dawson's Golden Chaff on the list at the present time, that variety would have given a yield of 27, 28, or 30 bushels per acre.

MR. BUCHANAN: Mr. Zavitz says that he is rather surprised that Emmer has not become popular more rapidly than it really has. At Farmers' Institute meetings, and in talking with the students, I have heard people say that Emmer is doing splendidly with them. Mr. Glendenning, of Ontario county, and Mr. Kerr, an ex-student, also of Ontario county, have spoken highly of Emmer. It is a much better crop than it looks when growing. When growing, the heads seem short and small and the straw rather slender, not a very vigorous or promising looking crop, but when it is harvested, the yield is much higher than is expected.

A MEMBER: What land will Emmer do best on?

PROF. ZAVITZ: Emmer will do very well on a variety of soils. I think it will do best on good clay loam or sandy loam, but it is supposed to do comparatively well on rather poor land where other varieties of spring wheat will often do poorly. Emmer will stand later seeding than nearly all other kinds of cereals, such as oats, wheat and barley. According to our experiments, the order of seeding in the spring should be spring wheat, barley, oats, peas, and Emmer, for the best results in Ontario.

A MEMBER: I notice by the reports that Emmer has given a yield of 1,850 pounds per acre, while barley only gave 1,649. Is there much difference in the percentage of hull of the different grains?

PROF. ZAVITZ: Emmer has about 22 per cent. of hull, barley about 15 per cent. and the average variety of oats about 30 per cent.

A MEMBER: What about the feeding value of Emmer?

PROF. ZAVITZ: We have not made any experiments in feeding Emmer, but experimenters in the United States have found that they get very similar results from Emmer and barley, pound for pound.

PRESIDENT CREELMAN: Was the land used for the fertilizer experiments good land to start with?

PROF. ZAVITZ: We asked every experimenter to use the average soil of his farm. If a man is going to experiment on his own farm, it is to his interest to conduct the experiment on the average soil of his farm. In all reports received, the detailed results giving the kind of soil, etc., are furnished in every instance.

PROF. HARCOURT: One point that is brought out is the cost of the increase. I think it should be mentioned that the effect of the fertilizers is not all gotten the first year. There is another point that might be mentioned. We notice, for instance, that in growing turnips the superphosphate gave 26.1 tons, and the complete fertilizer gave 26.8. That brings out clearly the characteristics of the turnip, and they require superphosphate. The great advantage of the individual study of this question by the experimenter, is that he gets an idea of the particular constituent that is required by the crop.

A MEMBER: How do you apply the nitrate of soda?

PROF. ZAVITZ: The fertilizers were all sown broadcast. The muriate of potash and the superphosphate were sown at the time of sowing the crops, and the nitrate of soda was sown when the crops were three or four inches high. We asked each experimenter to stir the soil an inch or two in depth on all the plots at the time of applying the nitrate of soda.

Q.—Don't you expect more economical results on poor soil than you would on rich soil?

PROF. ZAVITZ: We often get very good results indeed from an application of fertilizer on pretty rich soil. I remember one report that I did not include in these summaries, because it was from a man who had only five acres of land, and he had been manuring this land very heavily in each of five or six years, using a large amount of farmyard manure each season, and so I considered it unfair to include it in with other reports of experiments conducted under more average conditions. That man received a large yield per acre all through, but there was as much influence from the fertilizers in that experiment as there was from almost any of the experiments on the average qualities of soil.

While it is true that farmyard manure has given the largest yield per acre, still there are many people who say they cannot get a sufficient amount of farmyard manure. They can often supplement the farmyard manure with commercial fertilizers to good advantage.

MR. FRASER: Why was not an account made of the results of using cow manure on mangels?

PROF. ZAVITZ: We started the experiments some years ago with oats, with corn, and with mangels, and did not include farmyard manure. Later on, we decided to include the farmyard manure for the other crops and tried to make the instructions as definite as possible. We asked the farmers to use cow manure in every instance.

PRESIDENT CREELMAN: Two years ago we were visited by nearly two score Scotch farmers who were appointed by the Agricultural Commission of Scotland to visit Canada and look into our conditions with the idea of taking home some thoughts that could be put into the form of a report for the benefit of agriculture in Scotland, and after they had visited from one end of Canada to the other, not only looking at the Agricultural Colleges and the Experimental Farms, but going to the ordinary farmer and trying to find the difficulties of the average farmer, they said to me before leaving, that the one thing they could not understand was that the farmers of the Province of Ontario should be content with producing our present average crops of wheat oats, peas, barley, and potatoes, when by the application of more manure, either barnyard or commercial fertilizers, they might, in many instances, produce twice the crop. They came to the conclusion that if they would expend every year from $5 to $10 per acre for fertilizers, year after year, it would pay. All the farmers in Scotland use a large quantity of commercial fertilizers as well as all they can raise in the way of farmyard manure.

Is it your experience that it would pay our farmers to spend $5 an acre each year for more fertilizers? Would that be a paying proposition in dollars and cents?

PROF. ZAVITZ: I think it would in some instances, and not in others. They would need to know pretty well what they were doing, and apply the right fertilizers to the right crops. I have great faith in the proper handling and application of farmyard manure, and in the use of leguminous crops in the rotations. Commercial fertilizers are valuable as supplementary to these.

We must remember that the land is more expensive in Scotland and in England, and if they only get the same crops as we do, they would probably not have enough to pay rent and the only way to get a margin is to use a good deal of fertilizer, and when they have high priced land and receive high prices for the crops, they can afford to use a large amount of fertilizer.

In Connecticut, Maryland, and New Jersey, the results from using commercial fertilizers are much more marked than they are here. I believe it is an excellent policy in Ontario to make the very best possible use of clover and alfalfa and of the farmyard manure, and to study carefully how we can use commercial fertilizers to supplement the clover and the farmyard manure, and wood ashes and other natural products of the farm, that we can get so easily and so cheaply if we only manage properly, and then to supplement these with some commercial fertilizers used in the very best way. I think the work we are doing is giving the farmers some most valuable information on the study of the soil and the economic use of fertilizers, especially with regard to mangels, and turnips and potatoes. I believe

it is safest in Ontario first and foremost to give particular attention to our farmyard manure and to our leguminous crops, and then to study the use of commercial fertilizers to supplement these.

PROF. HARCOURT: Whether $5 an acre or any other quantity could be used on the farms of Ontario, depends on cultivation as much as anything else. Fertilizing will never take the place of cultivation and unless the land is thoroughly cultivated the $5 is thrown away. And that is where the Scotch farmers are ahead of the Ontario farmers in the thoroughness of cultivation. They can put a large amount of fertilizer in the soil and can be sure they will make use of it, but on poorly cultivated soil, you may put it there, but you will not get the results. We can only use fertilizers economically when we give the very best cultivation, and unless we are prepared to give that cultivation, we had better keep the money in our pockets. Our commercial fertilizers should be looked upon as adjuncts to the plant food we already have in our leguminous crops and barnyard manure.

MR. BUCHANAN: We must remember that in the Old Country the population is more dense and they can give a cultivation that we cannot afford to.

PROF. ZAVITZ: I wish to emphasize what has been said in reference to the cultivation of the land. I believe the cultivation has probably more influence than the fertilizers which we put into the soil. I have been greatly impressed with the great value of thorough cultivation from our own work in the Experimental department at the College. We have a regular rotation of crops and we manure once in four years. We usually get large yields, and I believe that it is principally due to the fact that we use good seed and that we cultivate the land properly before we put in the crops. We never sow a single plot until we have the land in a good state of cultivation. I believe that the lack of the thorough cultivation of the soil is one of the great weaknesses in the farming of Ontario at the present time.

We now have another year's experience with our experimental work in agriculture in which almost 5,000 farmers took part and at an average cost to the Union of about 36 cents for each experiment, or a total cost of less than $1,800 for all this work. These experiments were conducted on farms throughout Ontario, thus forming centres for observation, giving not only the men on their own farms object lessons but also affording others an opportunity of seeing these experiments. When we realize that this work was brought in touch not only with the four or five thousand farmers who conducted them, but also with thousands and thousands of others who saw these experiments, we comprehend something of the increasing influence and of the great importance of this co-operative work in the Province of Ontario. We are encouraged to go ahead and even increase this great work, realizing as we do that it is accomplishing much for the betterment of our agriculture.

Farm crops in Ontario amount to about $150,000,000 annually. The crops we were talking about yesterday afternoon have an estimated value of $100,000,000 every year. We are, therefore, dealing with a matter of no small significance. There are great responsibilities not only on those directing the work, but also on all the experimenters throughout Ontario. I wish in this public way to thank these 4,856 Ontario farmers who conducted the work upon their own farms during the past year, and who have furnished us with these results, which I hope will be of value not only to themselves but to the other farmers throughout Ontario. (Applause.)

RESULTS OF CO-OPERATIVE EXPERIMENTS WITH FERTILIZERS ON SWAMP SOILS.

By W. P. Gamble, Professor of Soil Chemistry, Agricultural College, Guelph.

Owing to the shortness of time at my disposal, it is impossible to discuss any results of fertilizer work of previous years, and I will have time simply to deal briefly with the results secured this year.

Co-operative experiments were conducted in 1909 with corn, oats, potatoes, rape, millet, and mangels. The plan of experiment was as follows: Land as uniform as possible was selected, and in the case of corn and potatoes, six plots 1-40 of an acre were accurately measured and treated as follows:—

No. 1. Unfertilized.
No. 2. Complete fertilizer.
No. 3. Nitrate of soda and muriate of potash.
No. 4. Superphosphate and potash.
No. 5. Nitrate of soda and superphosphate.
No. 6. Barnyard manure.

whereas, with oats, rape, millet and mangels, a series of seven plots 1-40 of an acre were used, the plan in this case being as follows:—

No. 1. Unfertilized.
No. 2. Complete fertilizer.
No. 3. Nitrate of soda and muriate of potash.
No. 4. Superphosphate and muriate of potash.
No. 5. Nitrate of soda and superphosphate.
No. 6. Muriate of potash.
No. 7. Barnyard manure.

Table I.—Experiments with Corn and Potatoes.

Plot.	Fertilizer used.	Lbs. per acre.	Yield of Corn—Bushels per acre.				Yield of potatoes
			I.	II.	III.	Average.	Bush. per acre.
1	No fertilizer.....	.....	32.9	28.5	12.8	24.7	96.0
2	Superphosphate..... 500 Muriate of Potash.... 160 Nitrate of Soda..... 150		49.5	58 7	36.5	48.2	184.6
3	Muriate of Potash.... 160 Nitrate of Soda..... 150		46.2	45.5	21,6	37.6	164.0
4	Superphosphate..... 500 Muriate of Potash ... 160		46.1	25.9	26.4	32.8	92.6
5	Superphosphate . ... 500 Nitrate of Soda..... 150		52.0	44.4	25.5	40.3	124.0
6	Barnyard manure	20 tons	48.1	39.3	28.4	38.6	184.0

Note.—Amounts of Sodium Nitrate reduced to 100 lbs. per acre, and Muriate of Potash raised to 200 lbs.

Let us first examine the results obtained from the corn experiments. It will be seen that three separate experiments were conducted, and in every case except one, the yield obtained by the use of fertilizers greatly exceeded the yield from the unfertilized plots. It will be further observed that the complete fertilizer practically doubled the yield over that obtained from the unfertilized plot. This experiment clearly illustrates the characteristic of the corn crop, namely, the necessity of the plant's food being, first, in a soluble condition, and, secondly, present in large quantities. It also illustrates the marked results of soluble nitrogenous fertilizers on the corn crop. Barnyard manure also gave a very marked increase over the unfertilized plot, and emphasizes the importance of heavy and liberal manuring for this crop.

It may be a matter of interest to some to note the great variation between the yields obtained in the three experiments, all having received the same amounts of fertilizers. This variation was due to the difference in the soils themselves. Experiment No. 1 was conducted on a fairly heavy clay loam in good mechanical condition. The previous crop was oats. Experiment No. 2 was conducted on a good average loam and the previous crop was barley. Experiment No. 3 was also a loam, which had been cropped heavily for a number of years, so that it was pretty well depleted of its humus. This accounts for the smallness of yield on the unfertilized plot in Experiment No. 3, the yield being only 12.8 bushels per acre, as compared with 28.5 bushels in Experiment No. 2, and 32.9 bushels in Experiment No. 1. Further, the necessity of an abundance of humus in the soil is also clearly shown. While none of the yields obtained were maximum ones in either the unfertilized or fertilized plots, nevertheless, the increases gained are sufficient to clearly illustrate the benefit to be had from application of artificial fertilizers on corn.

Experiments with Vegetables.

Onions, cabbages, and tomatoes were all experimented upon with very marked results. It will be found that in the case of both onions and cabbages a ready response was got from the application of soluble nitrogenous fertilizers, particularly in the case of the cabbage crop. Cabbage being a leaf crop, and nitrogen being the constituent that stimulates leaf and stem growth more than all others, this is readily explained. In fertilizing cabbages with nitrate of soda, it should be applied in three applications, rather than all at once, owing to the soluble nature of the material. It must be remembered also that it is most needed in earliest stages of growth, particularly so in cold and backward seasons.

With tomatoes, the best results were obtained from the application of a complete fertilizer. In this case, the addition of potash and phosphoric acid helps in the formation of the fruit, while the nitrogen helps to produce a strong, thrifty plant with good leaf and stem development.

In the case of onions, fresh stable manure is to be avoided on account of weed seeds, and also because it favors the growth of the onion maggot. Stable manure is preferably used on soil two years before planting onions. An *excess* of nitrogen delays the ripening and injures the keeping quality of onions.

Experiments with Oats, Rape, Millet, and Mangels.

In connection with the experiment conducted on oats, it might be said that the yields given are for the total crop (grain and straw). The complete fertilizer gave a very marked increase of two tons per acre. In every other experiment also, it will be seen that the yield was very materially increased.

TABLE II.—EXPERIMENTS WITH OATS, RAPE, MILLET AND MANGELS.

Plot.	Fertilizer used.	Lbs. per acre.	Oats tons per acre.	Rape tons per acre.	Millet tons per acre.	Mangels tons per acre.
1	No fertilizer	.....	1.1	4.4	2.8	4.0
2	Superphosphate Muriate of potash Nitrate of soda	500 160 160	3.1	11 8	7.6	13.5
3	Muriate of potash Nitrate of soda	160 160	2.3	5.2	3.2	12.0
4	Superphosphate Muriate of potash	500 160	2.8	9.6	6.1	13.2
5	Superphosphate Nitrate of soda	500 160	2.6	9.4	4.0	9.3
6	Muriate of potash	160	2.2	8.6	4.1	11.1
7	Barnyard manure	20 tons.	2.3	11.2	6.1	12.2

A large increase in the rape crop was obtained from the application of a complete fertilizer also—the increase being 7.4 tons per acre. Barnyard manure also gave a big increase of 6.8 tons per acre over the unfertilized crop.

Millet responded readily to an application of a complete fertilizer, giving an increase of 4.8 tons per acre over the unfertilized plot. Other fertilizers also all gave a more or less marked increase.

In the case of mangels, the complete fertilizer increased the yield 9.5 tons per acre. Barnyard manure increased the yield 8.2 tons per acre.

These crops, oats, rape, millet and mangels, were grown on typical muck soils and it will be seen from the results that potash and phosphoric acid are the constituents that contributed most to the increased yields.

PREFERENCE SHOWN BY PLANTS FOR DIFFERENT FORMS OF FOOD.

It is a fact of great interest and importance that one form of fertilizing constituent is preferred by some plants to the same constituent in another form. This preference is indicated by greater yield, or by better quality, or by both; thus, wheat seems to give better results when nitrogen is applied in the form of nitrate of soda than in any other form. Spinach has been found to do better with sulphate of ammonia than with nitrate of soda, while the reverse is true of asparagus. The quality of tobacco is injured by potash in the form of muriate, and hence only sulphate should be used for fertilizing purposes. The quality of sugar beets and potatoes appears to be better when sulphate of potash is used. Hence, while the soil may contain certain quantities of fertilizer naturally, it would pay to give serious attention to the so-called chemical fertilizers, and to their nature and source.

USE OF FERTILIZERS.

There is no way to tell without experiment what food constituent a soil lacks. The crops themselves give valuable suggestions. As a rule, lack of nitrogen is indicated when plants are pale green in color, or when there is a small growth of

leaf or stalk, other conditions being favorable. A bright deep green color with vigorous growth of leaf or stalk is, in the case of most crops, the sign that nitrogen is not lacking, but does not necessarily indicate that more nitrogen could not be used to advantage. An excessive growth of leaf or stalk accompanied by imperfect flower and fruit development indicates too much nitrogen for the potash and phosphoric acid present.

When such crops as corn, cabbage, potatoes and so forth, have a luxuriant healthful growth, an abundance of potash in the soil is indicated, also, when fleshy fruits of fine texture and flavor can be grown. On the contrary, when these plants fail of luxuriant growth, or are very low grade in quality, it is a certain indication that potash is lacking. When a soil produces good, early maturing crops of grain, with plump and heavy kernels, phosphoric acid will not generally be found deficient in the soil.

In order, therefore, to ascertain with greater certainty what food constituents are lacking in any particular soil, the surest, in fact the only way, is for each farmer to conduct experiments on his own soil and crops. Apply fertilizers as indicated in the preceding tables. The results can then be studied and the yield of crop ascertained. In carrying on such experiments, several difficulties may be met. The season may frequently be such as to interfere seriously with the favorable action of the fertilizers applied. Thus, severe drought may counteract all other conditions and prevent a satisfactory yield. The difference in the mechanical condition of the soil of the same farm, or even of the same field, may prevent a fair comparison of the action of the different kinds of fertilizing materials. A late, wet spring may also interfere. But, notwithstanding these difficulties, valuable suggestions will be obtained from an experimental study of one soil through the behavior of the crop.

Suggestions Regarding the Purchase of Fertilizers.

It will generally be found more economical to purchase separate fertilizer ingredients, rather than mixtures. In applying fertilizers, bulk is often desirable, but in purchasing commercial fertilizers the object should be to secure as much nitrogen, potash, and phosphoric acid in available forms as possible for one dollar, instead of as many pounds as possible of fertilizer regardless of the amount of plant-food contained in it. This is particularly applicable to mixed fertilizers. Since there is smaller bulk to handle in mixing, a smaller number of packages for holding, and consequently less weight and freight, it is, as a rule, more economical to purchase fertilizers in their more concentrated forms.

Q.—Have you tested the value of acid phosphate applied with manure?

A.—No, we have not.

Q.—Would it pay to use acid phosphate on manure?

A.—I should think it would be beneficial because it is of an acid nature, and there would be no danger of the material attacking the ammonia.

Q.—Do you think the two used together would give better results than separately?

A.—I think very possibly they might. In fact from the results here recorded and from general experience, I believe I am safe in saying that the combined fertilizer seems to give better results than when one only is used. In fact in a number of cases, the use of potash and superphosphate and nitrate of soda will give better results than any single material.

Mr. Hamer: This year we were able to use some land that we used last year, so that we can compare fertilizers of previous years and fertilizers of this year.

We have some interesting figures this year, and we have also had the good fortune to have everything come out as we would expect it, which is contrary to the usual experience. In our potash alone, it gave us an increase of $4.80 and the cost of fertilizer was $2.10, making a profit of $2.70 on potash alone for one year. That was just one of the results we got. We had similar results in potash and superphosphate, but I have not the complete figures with me.

Prof. Zavitz: I see in the audience Mr. Emslie, who is interested in fertilizer work, and I am sure we would be very glad to hear from him. We all want to work together for the interest of the agriculture of Ontario. Mr. Emslie has been doing good work in Ontario.

Mr. Emslie: I do not know that I have very much to add to what Prof. Zavitz and Prof. Harcourt and Prof. Gamble have already said about these experiments. One thing I would like to refer to is that we may apply potash to a soil which would be deficient in one of the other ingredients, and we would not get the maximum result. In that table of Prof. Gamble's, in comparing plots 2 and 3, we see the effect of leaving out the potash. In plot 3 the potash was left out and the yield dropped. Then in plot 4, comparing it with plot 2, we find the effect of leaving out the nitrate of soda. This illustrates the fact that the complete fertilizer must be used to produce the maximum results. If superphosphate were lacking in one soil and we applied muriate of potash, we could not get the maximum results in that soil.

Prof. Gamble: Certain soils are poor because of their mechanical condition and not because of their composition. Therefore, a fertilizer applied to the soil in a poor mechanical condition, would not give as good results as might be obtained from the application of the same fertilizer on the soil in better condition mechanically, even though the soils might be of the same relative fertility.

REPORT ON CO-OPERATIVE FORESTRY.

By E. J. Zavitz, Professor of Forestry, Agricultural College, Guelph.

Since our meeting last year some important changes have taken place in the Forestry Department of the College. As was intimated in last year's report, the Government has started a Forest Station in the sand lands of Norfolk County. At present we have 1,000 acres which is being placed under forest management. As the details of this work will appear in another report, I will briefly call your attention to the general development as related to the work of this Union.

The creation of Forest Stations in older Ontario was a plank in the platform of the Forestry Committee of this Union several years ago, and it will be gratifying to those connected with the movement then to know that their efforts were not in vain.

The Forest Station in Norfolk County contains at present 1,000 acres of land unfit for agriculture but capable of producing good forest growth. There is, adjoining this area, at least 3,000 acres of similar land which should eventually be placed under forest management. This area contains about 40 per cent. of cleared land and probably less than this will actually require re-planting. The remaining 60 per cent. is covered with second growth which simply needs protection. The policy to be followed in managing these lands is to protect present young growth and gradually re-stock the cleared fields on which there is no chance for new growth.

The forest nurseries at Guelph have been moved to the Norfolk Forest Station and will be run in conjunction with the waste land problem.

This last season, the department sent out about 380,000 plants to applicants throughout the Province. We had expected a larger demand, but a number of the applicants were unable to handle the work, owing to the extremely wet season last spring. Our surplus material was used on the land at the Norfolk Station and here was planted about 40,000 Black Locust and Scotch Pine.

In regard to the condition of these plantations throughout the Province, I can report that the results are very favorable, many of the plantations containing from 80 to 90 per cent. of thrifty living trees. Last week I saw a plantation made two years ago at Rondeau Park, in Kent County, which surprised me. This plantation was made on Government land, and as an experiment no cultivation or preparation of the soil was given. The soil was sandy and covered with a light growth of grass and weeds. Usually the method is to make the planting lines with a plow by throwing a wide, shallow furrow in which the trees are planted. This furrow and the land thrown out protects from grass and weeds long enough for the young trees to get a start. Instead of preparing the soil as above the trees were planted in the sod. About 75 per cent. of the trees are living, and promise to survive. This sandy soil has the water-table close to the surface, and so is very moist, which probably explains the success of the experiment.

Many who receive our plants think they are too small, but this is one of the secrets of successful planting. Two years ago, Mr. Percy Reid, reported on his plantation made the previous spring. I examined his plantation a few days ago and found about 85 per cent. of the trees living. He told me that they were disappointed in the growth of the trees during the first two years, but this last season many of the White Pine had grown 18 inches. The plants take two or three years to become established, and then White Pine on average soil should grow from 18 inches to 30 inches per year in height.

I wish to call your attention to a picture on the wall showing a White Pine plantation made in Durham County on sand land in the spring of 1905. This photo represents the trees just after planting in 1905. To-day they are from 2 feet to 3 feet high. The educational value of these plantations is beginning to be felt. A number of men who are interested in the question of re-foresting the sand lands of Durham County have gone to see this small forest which only contains about eight acres, but which has proven the possibility of doing such planting. These men were skeptical about the work, but this one example has converted them.

It is hoped that these plantations scattered over the Province will influence others to re-forest the waste portions of their farms, and so assist in the maintenance of a proper proportion of woodland throughout the agricultural portions of Ontario.

REPORT OF CO-OPERATIVE EXPERIMENTS IN THE GROWING OF ONION SEED IN ONTARIO.

By A. McMeans, Agricultural College, Guelph.

The first thing that strikes one on reading this item on the programme is that it is a rather odd subject to experiment with, and I presume it is up to me to explain why it is on the programme. Last season, it was my privilege to make an investigation of the onion industry, not only in the Province of Ontario, but in some of the onion producing States to the south of us.

This work was done for the Ontario Department of Agriculture, at the request of the Vegetable Growers' Association, and in making the investigation, I also touched on the seed question. In looking up full information on that point, I found that onion seed was handled by the American Seed Trade Association to the extent of upwards of one million pounds of seed annually. About 70 per cent. of this seed is grown in California, the balance, with the exception of the Bermuda and Italian varieties, in the States of Connecticut, Pennsylvania, Ohio, Michigan, and a little in Oregon. In my investigation through Michigan and Ohio, I found several men who were growing onion seed extensively, and the thought remained with me, "Why not make an effort to produce onion seed in Ontario?" Onion seed generally sells for $1 a pound, and the crop would amount to a comfortable sum of money if we could produce it in the Province of Ontario. With that idea in mind, I selected very carefully, onion bulbs that were grown at the College, and they were sent to ten other places in Ontario, extending from the county of Huron on the west, as far east as Prince Edward County. While it is a little early to give complete results of what was produced, and I may say the season was very unfavorable all over Ontario, still we have complete reports from six of the experiments sent out.

Seed growers look at and size up the yield of onion seed in three ways: first, the yield per acre, second, the yield of seed per bushel of bulbs planted, and third, the number of seed heads it takes to produce an ounce of seed. As this experiment is in its infancy, it was thought advisable to prepare a table enumerating not only the points mentioned above, but other points of perhaps minor but important detail.

Where Grown.	Number of Bulbs Planted.	Weight of Bulbs Planted. (Pounds).	Length of Row Planted. (Feet)	Date of			Number of SeedHeads Harvested.
				Planting.	First Bloom.	First Harvest.	
Leamington	109	30	50	May 15...	July 4....	Aug. 30...	98
Guelph	102	25	60	" 17...	Aug. 14...	Sept. 21..	210
Clarkson	100	25	50	" 14...	July 20...	Sept. 1...	148
Humber Bay....	114	28⅛	60	" 13...	June 29...	Aug. 28 ..	160
Simcoe.....	120	30	120	" 7...	July 20...	Sept. 4 ...	345
Scotland	134	35	64	" 5 ..	July 20...	Aug. 25...	327

Where Grown.	Weight of seed harvested. (Ounces).	Rate of seed production per acre. (Pounds).	Ounces of seed per bushel of bulbs planted.	Number of heads to produce an ounce of seed.	Weather conditions.		Soil and Remarks.
					1st half.	2nd half.	
Leamington.....	5	90	8⅓	19.6	Cool and moist.	Dry ...	Sandy loam.
Guelph	13⅝	206	27¼	15.41	Too wet.	Very dry	Clay loam needs drainage.
Clarkson	12	216	24	12.33	Very poor.	Very dry	Sandy loam, exposed to wind, lots of seed heads broken,
Humber Bay....	16½	250	29⅛	9.69	Very wet.	Very dry	Clay loam, facing northeast.
Simcoe.....	40	300	66⅔	8.62	Wet and cold.	Very dry	Sandy loam, clay subsoil.
Scotland.....	24	340	34⅞	13.62	Too wet.	Very dry	Heavy sand loam, southern exposure.

It is the intention to test out samples of the above mentioned seed at different places throughout Ontario to see if it is possible to find out what part of this Province can grow the best seed, and to also see if any change takes place by having the seed grown in one district and the crop from that seed grown in another. To give you an instance of what I mean, I will tell you what I gleaned from a California seed grower from a conversation I had with him this fall. He informed me that although California produced 70 per cent. of the onion seed sold in America, yet it was necessary for them to import onion seed from the New England States every year to produce the bulbs, which, when planted, gives them their crop of seed. If they planted their own grown seed to produce the bulbs for their seed crop, the onions from that seed crop would be much lighter in color and later in maturity.

This is the first year with this experiment, and we are only beginning the growing of onion seed in Ontario.

REPORT OF SCHOOL CHILDREN'S HOME GARDEN PLOTS, AND OF EXPERIMENTAL SCHOOL PLOTS IN ELEMENTARY AGRICULTURE, FORESTRY AND HORTICULTURE.

By Prof. S.B. McCready, Director, and Prof. H. L. Hutt, Secretary.

This is the first annual report of the Schools' Division of the Ontario Agricultural and Experimental Union. At last year's meeting, the executive was authorized to proceed with the organization. This resulted in the appointment of a special so-called Schools Committee, composed of Prof. McCready, Director; Prof. Hutt, Secretary; Profs. C. A. Zavitz, E. J. Zavitz and Mr. E. A. Howes, representatives on Agriculture, Forestry and School Gardening respectively.

The general aim of the division was to adapt the Union work to suit the capacities of school children, and to organize it in such a way that teachers would be encouraged to direct the children in it, and to use the many experiences arising in the practical work as a means of education in the school.

In some respects it was not a new proposition. The work of the Union had always been open to the schools, and in a few cases had been undertaken. O.A.C. Bulletin 142, entitled "Gardening for Schools," and published in 1906, was largely concerned in showing how to adapt the Union work to the use of the schools. In 1907 and 1908, Prof. Hutt, through the Horticultural Division, sent out schools' experiments in growing and comparing varieties of vegetables. The new plans aimed to bring the work directly *to the schools* and make it distinctly *for the schools.* It was to be a reaching out after the child *through* the teacher. Without the teacher, the child was not planned for. Its chief aim was not to grow better vegetables or better grain, but to grow better *children;* and to do this by getting the teacher just to change her teaching matter and method a little.

The work was divided into two somewhat distinct sections. In one, known as the Children's Gardening Section, the Union offered to sell one cent seed packets to children for their own plots at home or in a school garden. In the other, known as the Schools' Experiments Section, teachers were offered seed free for four observation plots to be planted either in the school ground or in adjoining fields; these included a plot in Agriculture to show the seven different species of wheat, a plot in Forestry to show different maples, a plot in Horticulture to show the different kinds of onions, and a plot in Floriculture to show the different kinds of nasturtium.

For a commencement, only the best teachers were wanted to co-operate, and the names of these were secured through the Inspectors. In response to our offer,

applications were received from 116 schools for work in the Children's Gardening and from 22 schools for the Schools' Experiments. In all, about 150 teachers took part in the work, as several of the schools participating were graded schools.

Children's Gardening Section.

In order to make the work uniform throughout the Province and easy for teachers to handle, a definite allotment of seeds was made for each grade in public school work.

For another year some changes will be made in this selection, but this year we were restricted to such seed as could be the easiest procured.

The following was the selection:—

Class.	Flowers.	Vegetables.
Junior 1st	Nasturtium	Lettuce.
Senior 1st	Sweet Peas	Radish
Junior 2nd	Calendula	Beets.
Senior 2nd	Corn Flower	Spinach.
Junior 3rd	Petunia	Bush Beans.
Senior 3rd	China Pinks	Carrots.
Junior 4th	Verbena	Onions.
Senior 4th	Asters	Sweet Corn.

The seed packets were sent to the children in a larger envelope in which was a little booklet of instructions for the work. To the teacher a sheet of instructions was sent, suggesting plans for conducting the scheme and outlining many Nature Study lessons that could be based on the children's practical experiences.

A form on which to report the work in the fall was also enclosed for the teacher. From our standpoint, this was a necessary condition for going to the expense and trouble of sending out the material. Fifty-six schools only out of the 117 have reported so far—about 48 per cent. This is considered quite satisfactory, however, in view of the facts that many teachers change their schools at midsummer, and that many cases of failure or neglect are never heard of in this co-operative Union work.

More than 12,000 seed packets were sent out. As the distribution was limited to one packet of vegetable seed and one packet of flower seed to each child, this means that about six thousand school children received seed. Compared with the total number of public and separate school children in the Province (about 500,000) this is a small number. But it was considered a very good commencement for the work.

Most of the 117 schools were in the country, but town and city schools are included in the number. These schools were quite well distributed throughout the Province, as the following list will show. The numbers in brackets show the number of schools from which reports have been received.

Counties:—			*Counties:*—		
Brant	1	(1)	Renfrew	1	(1)
Bruce	2	(1)	Simcoe—East	36	(9)
Carleton	3	(0)	South	6	(3)
Durham	2	(1)	North	34	(17)
Essex	3	(1)	Waterloo	1	(1)
Hastings	2	(2)	Wellington—South	2	(1)
Lambton	2	(2)	North	4	(3)
Lanark	1	(1)	Wentworth	3	(1)
Norfolk	1	(0)	York	1	(1)
Oxford	1	(1)			
Perth	2	(2)	*Cities:*—		
Peterborough	1	(1)	Kingston	2	(1)
Prescott and Russell	1	(1)	Hamilton	1	(1)
Prince Edward	3	(2)	Guelph	1	(1)

It will be noticed that in the county of Simcoe alone there were 76 schools participating, including town schools in Collingwood, Orillia, Midland, and Penetanguishene. This large number was due to the active encouragement that came from the Inspectors as soon as announcement of the work was made. It was fortunate for us that other counties did not undertake it so generally. We should have been completely swamped.

The reports on this work were very encouraging. There is no failure reported, although two teachers report "not successful." With all the rest the verdict is "successful," "very satisfactory," "beneficial," "quite successful," "highly successful," "encouragingly successful," "very successful," etc. Many interesting things are told about the pleasure the children had in it, the fine bouquets brought to school or sent to the sick, the successful fall fairs that were held, the splendid opportunities it afforded for good lessons in Nature Study, Art and Composition, the good effect of the work on the school discipline, the bringing of the school and home interests into closeness, and the plans and ambitions for future work.

One of the most interesting reports is that from an Indian school on the Cape Croker Reserve, Bruce County.

Schools' Experiments Section.

In the Schools' Experiments Section of the work, twenty-two schools made application for material and were supplied.

Instruction sheets, giving directions for conducting the work and outlining a course of instruction in Elementary Agriculture through lessons based on the pupils' practical work, were sent out with the seeds.

Reports have been received from six schools. In every case reported, the experiment was considered satisfactory, but evidently there is more difficulty in conducting this branch of the work than the Children's Gardening. The experiments, however, open up more problems or lines of observation than the other work, and it is hoped that this side will grow as teachers become more used to the work and secure better school grounds. From year to year the experiments will be varied so that many phases of agricultural and horticultural work may be covered during the school years of a child. For 1910, however, the experiments for 1909 will be repeated.

On the whole, it would seem that the scheme is commending itself to our teachers, and in many cases to the parents and trustees as well. It furnishes the teacher a ready means of making a commencement, and brings with it too the encouragement that is aroused in working with others in a common cause and in similar ways. Nearly all the teachers who have sent in reports ask to be notified of next year's plans, and signify an intention of continuing the work. Several intend to try the work in plots in the school grounds, thinking that they can control it better and get better results through the competition that will naturally arise.

In discussing its effects on the children, several note the improvement in the school spirit and discipline.

Plans for the Future.

The work will be continued next year with a few changes. There will still be a charge made for the seeds. Instruction sheets outlining plans for teaching the subject will be sent to the teachers and reports on the work requested (it is hoped to raise the percentage of teachers reporting). The children also will receive printed

instructions for the practical work. Some changes will likely be made in the manner of ordering and distributing the seed packets. Some additional material will be offered. A special collection of tulips will be offered at a comparatively small cost for planting next fall in a formal bed in the school grounds (this will not be for private individuals). A collection of tree seeds will also be offered to encourage tree growing about the schools. And for those schools which wish to use vines for decorating the school walls or hiding outbuildings, a special collection of vines will be offered. In all cases a fair charge will be made for the material.

Teachers, who wish to be informed of particulars of next year's work, should address the Director soon after New Year.

Prof. Hutt: I think this is probably one of the most important lines of work that the Union has taken up for some time. The idea is not in growing better crops but in growing better children, and through them making better farmers and indirectly better crops.

Probably you all know there has been many attempts made in this Province to introduce Agriculture into the schools, and they have been more or less a failure I believe this method will be the most likely one to reach the goal which has been aimed at for some time, and will get the young people in the rural districts in touch with farm work. By working with them on their own home plots and taking the work right to them, I believe this work is going to grow and make itself felt throughout the Province. I have put considerable thought upon this matter, and it has been carefully worked out, and we think good will come of it.

AN ACT RESPECTING COMMERCIAL FEEDING STUFFS.

By Prof. R. Harcourt, Chairman of Committee, Guelph.

Your Committee on "Legislative Control of Feeds" desire to report that during the last session of the Dominion Parliament an Act known as "An Act Respecting Commercial Feeding Stuffs" was passed, and that this Act becomes operative on the first day of January, 1910.

The need for such an Act has been felt for some years. This is because an ever increasing number of comparatively new and untried feeding stuffs, principally mill by-products, have been offered for sale. Most of these are valuable additions to our list of cattle feeds, and are the residues from the manufacture of some specific product from the crops of the farm. They contain all the food constituents commonly found in fodders, roots, grains, etc., but in different proportions. Most of these by-products, including cotton-seed meal, linseed meal, dried brewers' grains, gluten meal, gluten feed, and the various kinds of bran, middlings, etc., are very much richer in protein than the original seeds or grains, because the substance extracted from them consists of fat, in the case of the first two, and of starch or of products rich in starch, in the case of the others, thus proportionately increasing the protein in the residues. For this reason, all of these by-products have been found to serve an excellent purpose in building up rations; they are generally palatable and healthful, and, if judiciously used, do not contribute any undesirable qualities to the products, beef or milk; besides, they possess the further advantage in that, in many cases, the cost of the ration is reduced by their use. Their intelligent purchase and economical use, however, require that the purchaser shall possess a definite knowledge of their composition.

Then, too, there are in the market mill by-products, such as oat hulls, oat dust, corn bran, pea bran, etc., which are comparatively low in protein. These feeds cannot be used to build up the protein side of a ration, and some of them are dear at any price. Furthermore, mixtures of various by-products are offered for sale under a trade name that gives no clue to their probable value. There is also a tendency to mix low-grade by-products with those the farmer is familiar with, as, for example, oat hulls with wheat bran. With this condition of affairs, it is evident that the purchaser cannot form a correct idea of the probable composition or value of feeds from the name they bear, and, naturally, there has been a growing desire that something be done to place the marketing of these materials on a more practical basis.

To the Experimental Union belongs the honor of first drawing the attention of the Government to the need of some legislative control of the sale of the mill by-product, by passing the following resolution at the annual meeting in 1903: "That the Experimental Union memorialize the Dominion Government to enact a law that the manufacturers of all by-products used as feeding stuffs for live stock, such as bran, oil cake, gluten meal, etc., be compelled to place upon the package the analysis of the same, showing the protein, carbohydrates, and ether extract the food contains, and that the same be guaranteed." The petition was forwarded in due course and acknowledged by the Department, but no further action resulted. During 1904, attention having been thus called to the subject, the members of the Union spent considerable thought and observation upon it, and were so fully convinced that their previous stand was a correct one, that at the annual meeting the matter was again brought up and the same action taken as in 1903. As a result of this petition, the Minister of Inland Revenue called a meeting at Ottawa on June 6th, 1905, at which there were present the Deputy Minister of Inland Revenue, Mr. W. J. Gerald; Mr. F. T. Shutt, Chief Chemist, Dominion Experimental Farm, Ottawa; the late Mr. Thomas Macfarlane, then Chief Chemist of the Department of Inland Revenue; and Mr. W. P. Gamble, Assistant Chemist, Ontario Agricultural College. This committee, after full consideration of the subject, came to the conclusion: (1) that it was impracticable to fix standards; (2) that extensive collections of these feeding stuffs should be made, the samples analysed, and the results published in bulletin form.

These conclusions, which eventually took the form of recommendations, were presented at the annual meeting of the Union in December, 1905, and adopted. The published analyses of the samples collected confirmed the results obtained in our laboratory and previously published in Bulletin No. 138, namely, that the feeding stuffs varied greatly in quality, and that many of the brans were largely adulterated, and that their feeding value bore no relation whatever to their prices. At the annual meeting in 1906 these analyses and conclusions were presented, and a resolution was passed which advised as follows:

(1) That each package of commercial feed stuff should be labelled with the percentage of protein and fat contained therein;

(2) That the term bran should be legally defined;

(3) That copies of the resolution should be sent to Farmers' Institute meetings to be signed by the members, and that, when signed, they be forwarded to the Minister of Inland Revenue and construed as a petition asking for the labelling of packages and the definition of the term bran.

These petitions, which were largely signed, were in due course transmitted to the Department of Inland Revenue. As no action was taken by the Government, the following resolution was passed at the meeting of the Union in 1907:

"1. That this meeting approve of the action taken at last year's annual meeting, and that we again urge upon the Honorable the Minister of Inland Revenue the desirability of a law enacted on the lines of last year's resolution.

"2. That if necessary a delegation be sent to Ottawa to urge upon the Government the necessity of Legislative control."

Acting on the above instructions, your committee arranged that a delegation composed of farmers, manufacturers of mill by-products, and Experimental Station workers lay the matter before the Ministers of Agriculture and Inland Revenue. This was done in March, 1909, with the result that the Commercial Feeding Stuffs Act was prepared and passed by the Senate and House of Commons and comes into force the first day of January, 1910.

This Act provides that no commercial feeding stuff can be legally offered for sale in the Dominion of Canada until it is registered with the Inland Revenue Department. It is then given a registration number, which, together with the guaranteed per cent. of protein, fat and fibre, must be affixed by the manufacturer, or agent, to every package of commercial feeding stuff sold or offered for sale. The statement required is as follows:

1. Name of Brand.
2. Registration Number.
3. Name and address of Manufacturer.
4. Guaranteed analysis.

This may either be printed on the sack, or a printed tag, bearing the required information may be attached to the package.

The Act defines a commercial feeding stuff as follows:

"Commercial feeding stuff," "feeding stuff," and "feed," mean any article offered for sale for the feeding of domestic animals, and feeds claimed to possess medicinal as well as nutritive properties, excepting only hay and straw, roots, the whole seeds or the mixed or unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat or flax seed; wet brewers' grains; the bran or middlings from either wheat, rye, oats, peas or buckwheat sold separately and not mixed with other substances."

It will be noticed that whole seeds or the mixed or unmixed meals made directly from certain grains are exempted, as are also bran and middlings from either wheat, rye, oats, peas or buckwheat as long as these are sold separately and not mixed with other substances. There was no desire on the part of the framers of the Act to in any way hamper trade in these commercial products. Therefore, these common, well known products that are sold in large quantities locally, were not included in the Act. It is recognized, however, that fraud has been practised in the mixing of oat hulls with wheat bran, and that meal from mixed grains may be adulterated. To check this without putting the manufacturers to the inconvenience and expense of stamping the composition on the package, it was decided to deal with the adulteration of these products under the Adulteration Act. With the object of determining a fair standard composition, the Chemist of the Inland Revenue Department collected and analysed 545 samples of bran, middlings and mixed feed or "chop." Basing his decision on these analyses, and also on those made elsewhere, the Chief Chemist will recommend what he considers should be a fair minimum percentage of protein and fat, and maximum percentage of fibre in pure products of this nature. Thus, if after all the analyses are completed, he finds that good wheat bran should contain not less than 14 per cent. of protein, 3 per cent. fat and not more than 10

per cent. of crude fibre, these figures may be accepted as a standard for bran. If then bran offered for sale be found on analysis to contain less of the first two or more of the last named constituents, it would be deemed adulterated. It is expected that the adulteration of these more common products may be controlled in this way.

The Commercial Feeding Stuffs Act ought to be decidedly beneficial in three ways:

1. It will protect the stock feeder against low grade and mixed by-products with which he is not familiar.

2. It will protect the manufacturer and dealer against dishonest competition.

3. It will promote a more intelligent use of the mill by-products, and thus directly help to bring about a more economic use of all feeding stuffs.

It is to be hoped that farmers, dairymen, and all feeders of live stock will make themselves familiar with the terms of the Act, and so study the composition and price of the feeds offered for sale that they will be able to make the best possible use of these in supplementing the home grown roughage in producing economic gain, whether for growth, or fattening, or for milk production.

Hon. Nelson Monteith: As one of the original committee having to do with this matter, I feel we have reason to congratulate ourselves as a Union in having our efforts come to fruition at such an early date. I am glad we have so early secured in part that which we aimed at in the beginning. The amount of foodstuffs consumed in this Province is enormous.

There is one point that I think the Union might bestir itself about, and that is with regard to bringing in the tailings from the elevators at Port Arthur. These are distributed throughout the Province, and I feel that we, as guardians of the agricultural interests, should make such effort as we can possibly make to have what I consider a nuisance abated. A great many of these tailings are shipped in carload lots to the different food centres and they are poisoning the lands of Ontario.

While this is not speaking directly to the question, still it is a live issue. When our efforts have become so successful in the matter of foodstuffs, I think we might also take up with the proper authorities a request to grapple with this other evil.

Mr. W. S. Fraser: I heartily endorse what Mr. Monteith has said, not only with regard to the credit that the Experimental Union is entitled to, but also with regard to the reporting and dealing with the matter of these screenings from the elevator in the west.

I had an opportunity of seeing some mixed chop obtained from a mill which was dealing with these screenings, and it contained a large number of most noxious weed seeds. This is a very important matter. These weed seeds should be eliminated from the stuff before it is sold.

Mr. Graham, of the Poultry Department, had an experience with these seeds. They sent him a quantity gratuitously, of course by way of advertising it, and I think his statement with regard to it was that if he had continued using them a week or two longer, his poultry would have died. I do not know whether the Act that Prof. Harcourt has referred to will cover the mixing of these screenings and selling them as mill feed or not.

Prof. Harcourt: It will not cover that.

Mr. W. S. Fraser: I think the Experimental Union could put forth an effort along these lines.

PROF. HARCOURT: I would like to say one word upon that point before we leave it. As I understand it, under certain conditions the millers are allowed to bring the dockage here. In some cases the dockage is removed at Fort William and leaves the elevators with a large amount of this material to dispose of.

The contention of the millers is that what the Government allows them to bring into the country, the Government ought to allow them to sell. Therefore, if they allow them to bring the weed seeds into the country, they ought to allow them to sell them. In some cases these weeds are blown into the bran, and in other cases they are ground. If they are blown into the bran, they will germinate again.

The whole matter stands with the Dominion Government to deal with; but just as quickly as we ask for an Act to prevent the selling of material from the Western Provinces, we will have all the Western members to fight, and we cannot do much in a matter of that kind without a great deal of enthusiasm and agitation.

MR. BENSON: I feel a little out of place here because I am a manufacturer. I am very much interested in the remarks of Prof. Harcourt on the subject of gluten meal, because we are the largest manufacturers of gluten meal in Canada. I think Prof. Harcourt will bear me out in the fact that we are rather in favor of an Act of this kind, because we have nothing to be afraid of in the composition of our food.

On the other hand, looking at the industry as a whole, one must be careful in fixing the proportions, because there is no use limiting the proportion of protein in a product that you cannot live up to. For instance, our gluten meal never runs below 30 per cent. We try to keep somewhere in the neighborhood of 33 per cent. We explained to Prof. Harcourt that the way the Act now reads providing for a deficiency of one per cent. of protein and fat, or an excess of two per cent. in crude fibre, would be evidence of fraudulent intent. In food that contains such a high percentage of protein, it is almost impossible to keep it within these limits.

The Act, therefore, is a hardship on us, because it was necessary, in order to be on the safe side, that we should put an analysis on our food that is really below the possible average that we can strike.

The other point I wish to make is that the Act refers to bran or middlings from oats or buckwheat, while it does not touch on corn bran. I would like to know why corn bran was left out, because any analysis that I have seen of our corn bran stands higher than the pea bran. I would like if you would allow Mr. de Coriolis, an old student of Guelph College, to speak on this matter. It was because he wanted to come to this reunion that I came here with him. He is now our superintendent.

MR. DE CORIOLIS: To follow what Mr. Benson said in this matter, I just noted when Mr. Harcourt was reading the section of the Act that corn bran is omitted from the list of the various brans that are allowed to go on the market without registration. In one of Prof. Shutt's reports for 1909, there are some analyses reported on corn bran from our factory which gives eleven per cent. of protein and eleven per cent. fibre. We notice that pea bran gives five per cent. protein and fifty-one per cent. of fibre. And if such a feed as pea bran is allowed to go on the market without registration, it seems to me that corn bran should be allowed in the same class, as it is a much superior food.

Another point I wish to speak on is the question of gluten meal. Gluten meal is one of the products that has a high percentage of protein ranging from 30 to 38 per cent. It generally has an average of about 33 to 34 per cent. It is quite beyond control in the manufacture of corn meal to prevent this variation. The

corn may vary in its per cent. of protein. It may have different milling properties, the starch may not separate as easily in one case as another. These are various factors which make it impossible to control the products. Therefore, when we read the Act which says that a deficiency of one per cent. of protein or an excess of two per cent. of fibre should be considered as evidence of fraudulent intent in the total value of the foodstuff, we think that is rather hard on us. We do not know when we may be fined $50 or $100 just because our protein may have gone down one per cent.

It seems to me a much easier way of working the Act would be to have a classification of the foods, and foods with 10 to 20 per cent. of protein might be allowed a variation of one per cent., and those ranging from 20 to 30 per cent. should be allowed a variation of 2 to 3 per cent., and those containing from 30 to 40 per cent. a margin of from 3 to 4 per cent. If this were done the manufacturers would have more protection, and the variation of this kind would not show fraudulent intent, because I have pointed out to you that it is impossible to show this. We hope it will give better protection to the manufacturer, and at the same time protect the farmer, and will enable us to give the farmers a highly valuable foodstuff for their cattle.

PROF. HARCOURT: I would like to refer to section two of the Act in reference to this point that has been brought up. The Act was drawn up by the Chemist of the Inland Revenue Department and with the assistance of Prof. Shutt, of the Agricultural Department. They submitted a copy to me for consideration, and I wrote asking why peas were excepted in the first section. No mention is made of the fact that pea meal may be sold either mixed or unmixed with other grains, and I also asked why corn bran has been left out of the list of brans. I did not get any answer.

I do not see any reason why corn bran should not be allowed to be sold separately as well as bran of any other grains. We found in our own analysis that pea bran varied from 7 to over 12 per cent. in protein. Corn bran is just as valuable a meal as some of the others. If a small miller offered for sale a mixture of peas with other grains, he would be working contrary to this Act, because peas are not exempted. I do not know why it was not put on.

I think possibly the point is well taken with reference to the limitations of these substances which are rich in protein. It never came up in the discussion of the matter. Possibly because we did not have much direct help from the manufacturers themselves. It was thought one per cent. of a variation was a wide enough variation, but when we come to speak of these products that run over 30 per cent. protein—and anyone who knows how protein is determined knows that a very small error in the determination will make a difference of one per cent. in the material, especially when you work on substances so rich as this—and when you take into consideration the variation in the composition of the grain and the separation of the material, possibly one per cent. is too small a variation for these higher products.

In gluten meal we have had samples which contained 35 per cent. I do not know that we have any reason to believe that these have been adulterated. In some of these richer materials, it is possible a wider range will have to be allowed.

PROF. ZAVITZ: It seems to me that this is a most important subject, and also the subject that is referred to by the Hon. Mr. Monteith with regard to screenings. I do not think we should pass that over, and I wish to say a little with regard to that point.

You will remember that the Experimental Union took up the question of Forestry a few years ago, and although it was a difficult matter, they kept pounding away until they were successful, and then we took up the question of foodstuffs, and after seven years' work we have obtained what we started out to secure.

Now with regard to screenings from Fort William, both Mr. Monteith and Mr. Fraser believe what they say, and if they would put it in the form of a resolution to be brought before the meeting this afternoon, a committee could be appointed at the last session to take up this question and to report next year, and then they could consider whether the matter should come before the Provincial Government or the Dominion Government. Mr. Clark told me that he tried to do something in Ottawa, but they say it is not a Dominion matter, that it is a Provincial matter, and that is a question that the committee we appoint can deal with, and find out whether it should be presented to the Dominion or the Provincial Government.

I think we realize, and the farmers of Ontario realize, that there is a very great harm coming to the farmers of Ontario through weeds which are brought in, in the screenings. I think it is a matter that the Union should take up.

PROF. MCCREADY: I think something should be done here and now. We have found thousands and thousands of weed seeds from these screenings that are brought in. Undoubtedly many of the weed pests which we have received reports of from all over Ontario had their origin in these screenings, and while some of the seeds may be valuable for food purposes others are very harmful. The purple cockle seed that is in many samples is quite objectionable on account of its poisonous qualities. Ergot is also found and is objectionable. It seems to me that the Seed Control Act might govern the sale of foods as it now governs the sale of seed grains. Something might be done to make the millers kill the seeds by treating them at some high temperature. I would move that Mr. Fraser and Mr. Monteith be a committee to draft a resolution to bring before the meeting this afternoon.

MR. MONTEITH: I would move that Mr. McCready and Mr. Zavitz be added to that.

The motion was seconded by Prof. Harcourt and carried by the meeting.

IMPORTATION AND DISTRIBUTION OF NOXIOUS WEED SEEDS IN SCREENINGS.*

Your Committee, appointed to consider what method should be adopted to prevent the importation and distribution of noxious weed seeds in screenings to Ontario farmers, beg leave to recommend the following resolutions:

1. That owing to the introduction for feeding purposes of screenings containtaining noxious weed seeds and to the damage resulting from their wide distribution throughout Ontario, this Agricultural Experimental Union at its thirty-first annual meeting respectfully recommend and urge that such legislation be enacted as will remedy this evil.

2. That our former committee on legislative control of feeding stuffs be continued with power to add to their number to deal with the question.

The adoption of the report was moved by Hon. Nelson Monteith, and seconded by W. S. Fraser.

* For fuller information on this subject the reader is referred to the discussion on the paper entitled "An Act Respecting Commercial Feeding Stuffs," immediately preceding this report.

THE CHAIRMAN: If members would like to say anything in the way of discussion, we would like to hear from them now. Probably Mr. Clark, of Ottawa, could give us some suggestions. We would like to hear from him.

MR. G. H. CLARK: The resolution which is before the meeting is timely. It is a very important matter to consider in connection with the welfare of agriculture, particularly in the Province of Ontario. The trouble has now existed for more than seven or eight years. It is, I think, seven years ago since our Federal Government amended the Manitoba Grain Inspection Act, which allowed the chief inspector of grain at Winnipeg to give a higher grade on grain than he otherwise would. He has the privilege now of grading a car of wheat as No. 2, and mark on that certificate "Clean 5 per cent. or 3 per cent.," as the case may be. That car of wheat would go to the elevators at Port Arthur and three or five per cent. would be taken out. The farmer who produced that dirty grain would have to pay three or five per cent. for the process, and the cleanings from it would go into the possession of the elevator company that did the cleaning. I know, as a matter of fact, there are hundreds of car loads yearly that are accumulations of these so-called screenings. They have a relatively high value from the standpoint of the chemist. They have to be manipulated to a considerable extent to eliminate that part of the screenings that is objectionable to the stock. Most farmers know that very many species of mustard seed are bitter and they have to be removed. They have been doing very good work at both of the elevators in separating those screenings before grinding, and I have discussed the matter very fully with the head of the British Elevator Inspectors at Port Arthur, and with Mr. King, and both agree that it is entirely practicable to so grind those screenings that they would be almost entirely free from living seeds. They point out, however, that some farmers of Ontario want it not too finely ground.

It seems to me highly important in the interests of the Province of Ontario that conditions which now exist at Port Arthur and Fort William should be stopped. But there are evils existing in many of the plants and mills of Ontario. Many of the mills grind and put on the market feeding stuffs by the car loads which contain screenings. From an analysis of about forty samples, we found practically none that were entirely free from noxious weed seeds.

Next is the question as to what body should have first duty in dealing with that evil. It is a question I have given considerable attention to. I went so far as, three years ago, to draft roughly the essence of a bill that would correct that evil, so far as the Province of Ontario is concerned. Any legislation that is enacted by the Federal Government must be equally applicable to all the Provinces. That must apply in Manitoba where the wheat seeds are produced, as well as in Ontario, and legislation such as we could give in Ottawa, that would correct that in Ontario would not be acceptable in the Western Provinces. The Provinces of Manitoba, Saskatchewan, and Alberta have enacted laws dealing with those evils which existed in the respective Provinces.

Considering the evil as it exists in Ontario, it seems to me if you were to have an evil corrected by legislation, it would be better for the Province of Ontario to deal with it as the Provinces of the West did. If this meeting sees fit to pass that resolution, asking the Federal Government to make such legislation, I am not in a position to say how they will accept that resolution. Personally, I know that the Minister of Agriculture will do his utmost to meet the wishes of the people, if it can be done.

I cannot say more, and I do not believe you could have reasonable hope to have people in all parts of Canada agree to legislation that would correct the evil as you want, and as it should be corrected.

Prof. McCready: I would like to emphasize the idea Mr. Clark has left with us, that while there may be no hope that anything will be done by the Government at Ottawa, there is every reason to believe that our own Provincial Legislature can handle the question. Trade within the Province is a thing that can be dealt with by our own Legislature, and they may pass an Act compelling the sellers of these seeds at Fort William and Port Arthur to either grind them or treat them in some such way that they cannot produce plants. Our committee have good reason to believe that something can be done.

Prof. Zavitz: The way the question stands, the committee has full liberty to take it either to Ottawa or to Toronto, or to both, if necessary. It is left entirely with the committee to look into the question and to see where it can be dealt with to the best advantage.

The resolution, on being put to the meeting, was carried unanimously.

Those forming the committee to look after this work are Professors R. Harcourt, C. A. Zavitz, and Geo. E. Day.

TEACHING AGRICULTURE IN HIGH SCHOOLS.

By A. McKenny, Essex.

In the short time at my disposal, I shall not make any attempt to go into the history of the movement, which is no doubt more or less familiar to the most of you, but shall confine my remarks to the work which has been accomplished and the present condition of the experiment. Any views which I may have to offer have been derived from my experience in endeavouring to work out the plans of the Department for teaching Agriculture in the Essex High School. And while they may be true under the conditions which exist in Essex County, they might not apply to other sections of the Province.

When entering upon my duties, it was understood that the important feature of the work was to organize a class of boys, who would take the prescribed course in Agriculture.

This course was planned to extend over a period of two years, the work of these two years was supposed to be equal to one year's work at the Ontario Agricultural College. It was hoped that this course would appeal to boys from the farm, who were attending the High School and who would probably return to the farm or who were planning to attend the Ontario Agricultural College later.

Theoretically, this course looked fine. It was outlined to fit conditions in the county surrounding the High School. The principal of the school, the members of the High School Board and others identified in the movement were quite enthusiastic as to the value of the work prescribed, and the probable number of farmers' sons who would take advantage of it. A vigorous advertising campaign was undertaken through the branch office of the Department of Agriculture. Extension work was carried on throughout the county; judging courses, farmers' clubs, etc., were organized, and through these, the value of agricultural education was emphasized. But after two years hard work, I regret to say that our general course in agriculture has not proved the success which we had hoped for in the beginning.

Numerically, we seemed to be doing fairly well, closing last year's work with eight boys taking the work in agriculture. But of these eight, only three were farmers' sons, the remainder of the class being made up of boys from the town who were only interested in certain phases of the work. Though there were many farmers' sons in the school, nearly every boy was there for the purpose of getting away from the farm and took no interest in anything pertaining to agriculture.

This state of affairs, it seemed to me, did not fulfil the purpose intended. The question which arose was how to interest the farmers' sons in the work we were doing. The farmers themselves appeared to be very much interested as evidenced in the manner in which they had taken up different lines of work which we had inaugurated; as, for instance, the Ontario Corn Growers' Association, which was organized and is supported by the farmers themselves, and now has a membership of over 500 in the Counties of Essex and Kent.

One of the most serious drawbacks in connection with the long course work in the High School, is that it opens in the middle of September when every farmer's son is busy at home on the farm, and the only possible students we could hope to get were young boys from twelve to thirteen years of age who had just passed the entrance. This shut out dozens of young fellows from sixteen years and up who were just beginning to be interested in farm life, and who had quit school before or immediately after passing the entrance examination and were now beginning to feel the need of a better education.

Having sized up the situation, we concluded that our long course in agriculture in the High School was not reaching the boys, who were most in need of just such instruction as we were prepared to give them. We decided to draft a course which would be particularly adapted to the needs of the young farmers in Essex County. In order to make this fit in with the season in our section and with the work which we knew must be done before these boys could hope to get away, we advertised a six weeks' course in Agriculture to begin in January and end about the middle of February, in plenty of time for the spring work, which begins with us often as early as the first week in March.

Upon the day that we advertised this course to open, instead of one or two small boys, eighteen young men, ranging from sixteen to twenty-five years of age, appeared prepared to take up the work.

Many of these young fellows had been away from school for from six to eight years, and had forgotten a great deal of their elementary education, or never had gotten beyond fourth class work in the public school. But all were anxious to learn and made excellent progress.

The nature of the course was about as follows: Arithmetic with a practical bearing on farm problems, Farm Bookkeeping, Live Stock Judging, Seed Judging, Food Requirements of the Soil, Drainage, Identification of Weeds and Injurious Insects, etc. An effort was made throughout to make every subject as practical as possible.

The interest was such at the end of six weeks that the members of the class came forward unanimously asking that the course be extended for another two weeks.

Owing to the success attained in this winter course, and the evident value to the young farmers of the county, we have decided so far as our work in the High School is concerned, to concentrate all our efforts in developing this line, which for the County of Essex under the conditions which exist there seems to be the most satisfactory line to follow. The High School Board have not been slow in seeing the value of this winter course, and are spending a considerable sum of money in

fitting up a class-room to accommodate the much larger attendance which is expected at this winter short course.

Speaking generally regarding the progress of the experiment in other sections, where the work has been attempted, many of the men have met with similar results in connection with the two years' course in Agriculture in the High School. Some I find have abandoned the general course and are following other lines of work. Others are working along with fairly good success and with a fair attendance.

Whether or not a general course in Agriculture will ever be an established thing, or whether it would be wiser for those anxious for such a course to attend the Ontario Agricultural College, and there get a better course in half the time for the same money, is something that time will decide.

But for a course which touches the boy, who is just beginning to farm, and who is at the age to appreciate the work, and is unable to spare the time or money for a long or short course at an Agricultural College, the High School winter course seems to be the proper thing. It is at his home, it is cheap, and it gives him exactly what he needs, as the instructor is acquainted with these conditions, and has a chance to solve the problems which he is up against.

It has proven satisfactory for Essex County, and could, I think, be tried advantageously in other sections where High School work is being undertaken.

WHAT THE FARMERS' CLUBS ARE DOING.

By F. C. Hart, Galt.

Farmers' Clubs, so called, have been in existence for thirty years or more. It is only during the last year or two, however, that they have taken on a new impetus that has given them what I believe to be a permanent place in the development of Agriculture in this Province. Looking back over one year's work of the Farmers' Clubs in Waterloo County, we can see some important results already accomplished. In the limited time at my disposal I can mention but some of these.

And the most important perhaps is the awakening of an increased respect for, and interest in the business of farming by the farmers themselves. This may seem commonplace when you hear it spoken, but if you had seen, as I have, a whole countryside change in its mental attitude from one of a sort of indifference to a vast respect for the nobility of the calling, where the discussions at Institute meetings have taken on a new significance, where a hundred rural telephones, a rural mail delivery, and one of the best small rural schools in the Province, have all been brought into existence in the space of one year, you will begin to realize something of what at least one Farmers' Club has done in this respect. Wherever there has been a live Club, there the interest in questions touching the farmer and his occupation has been greatly enlarged.

The second most important object that I can see has been accomplished by these Clubs is the creation of a community spirit, and the enlargement of the social life in the district. To my mind this is a most important factor in rural life. We are gregarious creatures all, and one of the big reasons for the young people migrating to the cities is the desire to move among more people. In the country district, the pie social, the school concert, and the barn raising, are all largely attended, not because we like to eat pies and build barns, but because of the opportunities these occasions offer of seeing and enjoying more of the characteristics of our neighbours,

of learning more of humanity. They help to broaden from the 100-acre farm gauge. Where the Club and the local Women's Institute have united in holding semi-social evenings, marked results other than the success of these meetings have been noticed. The working on committees, the planning of details, the running of a plowing match or a short course, have given opportunities of seeing both the good and bad qualities of neighbours, of seeing the viewpoint of others, of broadening the outlook. I have seen some splendid results of this social influence of the Club.

One of the largest reasons for the advancement of the club movement is, of course, that it is an educational factor. And the value of discussions at Club meetings is enhanced by the fact that local men, understanding local conditions, are discussing local problems. Such meetings are often of much more value than the Annual Institute Meeting. I have heard members say that it is impossible to attend any meeting of a live Club without getting something of real value. All of the educational meetings of Clubs I have attended in the County are of an informal character, with the conversational form of address, and questions always in order. The success of the Clubs in Waterloo County is due in a large measure to the fact that both old and young men are taking an active part. And I think it is a mistake to suppose that the Club is a young man's institution. The younger men may have newer ideas, but the older men have the experience, have an intimate knowledge of local conditions of soil, of varieties suited to the district, and much other information that can be gained only by experience, and these things are essential. After all, the main reason of the Club is the endeavor to raise the standard of Agriculture in that district to the highest level, and it needs the best brains and experience of the community towards that end.

An educational department of many of the Clubs has been the experiments carried on by the members. We have had over 40 experimenters in the various Clubs, with spraying potatoes, with spraying fruit trees, and with commercial fertilizers on various crops on muck soils. The results of these experiments are being discussed at the meetings, and information valuable to the community is being obtained.

As a means of organization and co-operation, the Club has proved its value. Such an organization in a community has been a great aid towards the carrying out of some of the public utilities that might otherwise be long delayed in coming. As a result of the public spirit that has been awakened, rural telephones and rural mail delivery routes have been instituted. One Club has been the means of reviving the old plowing match on modern lines. Another has united with its market town in starting a continuation class, so that rural school pupils who would otherwise be deprived of it, might have the privilege of a High School education. Any large question that touches the community as a whole has been freely discussed by these Clubs. And let me say just here that in the working out of some of these problems, the country people and the townspeople have found the advantage of working together, and a good deal of local prejudice has been broken down.

Many other results of organization through the Club might be mentioned. A marked result of the organization of one such Club was the managing of one of the best short courses held in the Province.

I cannot speak of the Farmers' Club without mentioning its importance as a means of improving public speaking among farmers, especially young farmers. I believe that the farmer's low estimate of himself, which we hear so often deplored, is largely brought about by his inability to assert himself and to "measure up" with his fellow. And the cause of this is simply that he has lacked the opportunities. The power a man feels coming to himself when he is able to stand up and impress

his ideas on other men must have its effect for the betterment of the class, and be an aid towards increasing the respect for both the farmers themselves and their calling. And in this also I have seen marked results. As meeting succeeded meeting, the members who took part certainly gained in ability to adequately take part in the debate and in the discussions, and it is having an influence in increasing the value of the members, not only to the community, but to themselves. There has also been a marked improvement in the conduct of the business part of the meeting. Promptness, and the employment of proper business methods, so often lacking in a meeting of farmers, has been an excellent characteristic of the meetings.

Personally, I think that if the Club is to be a permanent organization, there are at least two things to be avoided. I refer to politics and excessive co-operation. There must of necessity always be two or more opinions as to political questions, and under our present system of party government politics will have a tendency to cleave an organization having education, and not politics, as its underlying principle. There are, and there is room for, other organizations for the political interests of the farmer.

What I mean by excessive co-operation is the clubbing together to buy some of our common supplies, such as salt, etc., that could be bought as cheaply or almost as cheaply from the local merchant. The local merchant is a necessity in any community, and we owe him a living; and by thus clubbing together to take away his profits we are depriving ourselves of the privilege of having a good local merchant. Not many local merchants are millionaires, so they cannot be making a marvellous lot out of us at any rate. It pays better to give the local merchant a little more for some few articles rather than to be penny-wise on a few hundred pounds of salt. There are many fields of legitimate co-operation open to the Club. If the local merchant cannot supply the quality of seed desired, no merchant can take offence if seed be obtained by members from the best source elsewhere. Co-operation in obtaining pure-bred stock, in conducting experiments, in limiting the varieties grown in the district, and in many other ways are all valuable lines of work open to the Club. With regard to the last mentioned, let me state that I believe one of the almost necessary evils of Ontario Agriculture to-day is the multiplicity of varieties, and that the Club might be made a very valuable factor in remedying this evil. After the experiments have demonstrated the variety suited to the district, the co-operation of the members in growing this one variety would result in much good in enhanced production and prices. We are planning to bring this scheme to a successful issue in at least one Club this coming year.

Looking into the future, it is difficult to foretell what the results of this Club movement may be. Through their agency we might in time be able to have not only specialized farming but specialized districts; instead of in many districts having some good beef cattle men and some good dairy men, *all* farmers in that locality would specialize in beef production or dairy products or fruit growing, etc., each district having its own distinctive policy; and such specialization all over the Province would be an immense step forward.

Many other benefits of these local clubs have been obtained, and the few remarks that I have addressed to you this morning are altogether inadequate to the importance of the Farmers' Club Movement in Ontario to-day.

MR. PUTMAN: While I believe that Farmers' Clubs will be most successful in those localities where we have a district representative located who will take a personal interest in the work and give directions, I see no reason why the Club movement should not be extended to other localities. At the present time we have about 130 Clubs that are doing active work, and we have enquiries from a great

many sections with regard to organizing. I see no reason why ex-students and Institue officers and other leading men should not take up the matter of organizing the farmers of the various sections into Clubs for the discussion of the common-sense matters in a common sense way for the common good.

We have adapted ourselves to local conditions and a discussion of the general purposes and products of the farms of the different localities is very important, and could be made one of the most effective lines of Agricultural educational work in the Province of Ontario. I would like to hear from some of the other men who have had experience in Club work.

Mr. Angle: I agree with Mr. Hart that no Club of farmers should co-operate to under-sell the town merchants. The Norfolk Fruit Growers' Association use an immense amount of spraying material, and they went to the merchants of the town and gave them an opportunity of selling to the Association spraying material, but the prices were not satisfactory. So they bought it themselves, and saved 50 per cent. on the very best prices that the town men could give them. It seems to me that town men in that case must have asked a big price. They could have afforded to sell it much cheaper; and if the farmers could have gotten it at a reasonable price they would have given the trade to the local people. When they save 50 per cent., I believe the Farmers' Club is justified in buying it co-operatively. But I do believe in giving the town men a chance first.

THE NEED OF LOCAL DEMONSTRATION PLOTS IN ONTARIO.

By H. Sirrett, Carp.

At first thought, this might appear to be an introduction of an old subject under a new name, but upon further consideration I think it will be admitted that it is a phase which as yet has not formed a large part of the agricultural educative propaganda in Ontario.

By "Local Demonstration Plots" is meant plots located at or near local centres, upon which the value of new kinds or varieties of crops or improved methods of selection, care, or cultivation would be demonstrated; which, by previous experiments carried on under conditions similar to those prevailing in that locality, have given most satisfactory results, and which varieties or methods were not being practised in that locality.

These plots would be used to carry on work after it had passed the experimental stage, and when desirable results could be confidently expected. In this way, the results of the work carried on by the Experimental department here and by the Experimental Union throughout Ontario would be placed before the farmers in the locality where such plots were situated, in a most tangible and striking way.

In the Experimental department at the College and in the Experimental Union, Ontario has a highly developed system of testing ways and means by which the productivity of her farms might be increased. A great deal of good has been done, but the value of this work might be greatly enhanced by the adoption of a method which would bring the knowledge thus gained forcibly before those who, so far, have been little influenced by it.

If a large percentage of the farmers of Ontario made occasional trips to Guelph, and spent a day in observing the results obtained on the plots at the

College, and afterwards supplemented what they had seen by a study of the reports issued from the Experimental department, it is possible that there would be no need of doing more than is now being done to carry to them the information which should be of such benefit. Unfortunately, in spite of the large numbers who visit the College annually, and who are in constant touch with the work that is being done here, there are still, especially in those counties more distant from Guelph, a large number of farmers who are seldom visitors at any experimental station and who read but little from the reports sent them.

The outstanding advantage of such demonstration plots is the conviction they carry by presenting unmistakable evidence of the value of the methods or varieties employed. If the results obtained are superior, they will attract attention which will lead to inquiry later, as to how such results were obtained. This eye-evidence carries a conviction as to the value of the point demonstrated which is not lost if equal success is not at first obtained by the adoption of the suggestions gained from the example set them. What they have seen accomplished they cannot but believe they may accomplish themselves.

During the summer of 1908, I had the opportunity of observing the interest taken in the experimental plots conducted in connection with the Morrisburg District Branch. There, I found that it was those plots upon which were growing crops which illustrated the claims made for them in the reports of the Experimental Union which excited great interest. In reality, the plots showed nothing but what those viewing them may have learned from reading the reports sent them. Possibly they had read that just such results would be obtained; still it remained for the actual seeing of these results to create an interest in how they might similarly increase the returns from their own fields.

In counties where District Representatives were situated, some such plan could, I think, be adopted with advantage. These plots could be conducted at more points than at the school with which he was connected. The expense incurred would not be at all large, and if the grant now made by the County Council for such work at the school was available for similar work at other points throughout the county, it would be sufficient to meet all the expense necessary.

VALUE OF EXPERIMENTAL WORK IN LANARK COUNTY.

By R. S. Hamer, Perth.

While the experimental work has not been the most important feature of our work in Lanark County, we have, nevertheless, undertaken a good deal of outside work along that line, and I judge that this fact explains Mr. Zavitz's choice of a subject for me. On the plots in connection with the school, we have conducted variety tests with various farm crops during the past two years, using seed obtained through the Experimental Union and from the Central Experimental Farm. The value of this work is in the comparisons of yields. Owing to the lack of conveniences for threshing and cleaning the grain, our cereal tests have not been of great value either in arriving at an estimate of the yield per acre of any one variety, or in making comparisons between varieties. These tests have been of value nevertheless to the boys in the school in acquiring familiarity with varieties, in studying types, and in making comparisons between varieties during the growing season. In the same way they have been of value to farmers in the immediate

vicinity of Perth. Needless to say, they have been of considerable value to ourselves in forming opinions regarding the suitability of varieties, etc. We also are making use of the seed obtained in this way by distributing half bushel samples of these selected varieties among the farmers.

During the past two years we have devoted considerable time to muck soil investigation work, and have under way a fairly extensive series of experiments on different types of this soil throughout the country. The building up of exhausted muck lands, the adaptability of various crops and of different varieties of the same grain crops have been the main features of this work. We have used mineral fertilizers of different kinds, and in different combinations, and have tested these in comparison with barnyard manure. In this year's work we have had an opportunity to test the influence of last year's fertilization in comparison with fresh fertilized ranges, and with some fertilized for the second time. The crops used have been Early Daubeney oats, Liberty oats, millet, rape, and roots. In connection with our oat experiment we have tested the suitability of ten different grasses and clovers for seeding down purposes on this land. Our results so far have been interesting, and some of the ideas suggested will, we hope, prove valuable when we have had a couple of years' further experimentation to confirm our deductions. This question is of great practical importance here, as there are thousands of acres of swamp land in this county which are being drained, often against the owner's wishes, by municipal and award drains. Much of this land which has been cleared is at present lying idle, while in other cases only comparatively poor crops are realized. Some of our work has indicated the value of phosphate on this land. If this result is confirmed, the deposits of rock phosphate in the immediate vicinity of Perth should prove of considerable importance to this district.

This year we have been carrying on some preliminary experimental work with corn with a view to selecting for early maturity and producing our own seed corn annually from some good dent variety. While this attempt in this latitude is contrary to the counsel of many corn authorities, we have had very encouraging results this year with two or three early varieties which we have brought in from Experimental Stations in the North-west States. We had an acre of Wisconsin No. 7 this season which matured well, and which has yielded us about sixty bushels of first-class seed. So favourably impressed were the farmers with this patch of corn that the farmer on whose place it was grown will be unable to supply all the orders for seed which have poured in on him.

A SERIES OF SHORT JUDGING COURSES.

By I. F. Metcalf, Collingwood.

In dealing with this subject I wish to have it understood that I am not pleading for others to take up this particular feature. I shall simply state what is being accomplished in Simcoe County under this system and what the end is that we are aiming at.

To begin with, we had in Simcoe County last winter Short Course Judging Classes at six points. Four of them were two day courses, and two of them were one day courses. I look on all of them as being quite successful, although the weather was not always what it might have been and the roads were practically blockaded one day, so that I have every reason to believe that the attendance would

have been larger still had we had favorable weather all through. I might say that I believe the weather has more to do with the attendance at these Short Courses in a number of places than it does with the attendance at a longer course in one central place, because a number will come in to the longer courses to stay right through; but if the farmers are driving in for a day say to the town to one of these Short Courses, a blockade of the roads will most certainly make a big difference in the attendance.

Our courses proved very interesting to the farmers, and I consider that the results were good. I am so favourably impressed with the good results of last year that I intend to conduct this winter's Judging Classes under very similar plans. Our conditions in Simcoe County are rather peculiar. In the first place, the county is a very large one and is not square cut so that there are large distances to be covered. The county runs 58 miles from north to south and 52 miles from east to west, and 65 miles from the south-west corner to the north-east corner. Besides that, the county is very much broken up with sand plains and also in the northern part by rocks, so that really there are quite a number of rather distinct divisions in the county which necessitates having Short Courses in a number of local centres rather than in one district centre.

I have tried to lay before you the reasons why we have adopted the scheme of having a number of Short Courses in this district. I do not believe it is an ideal system by any means, because you no sooner get nicely started with the farmers than you are done in that place and move on to another. You only touch as it were the fringe of knowledge of the subject. There is no time to get down at all deep into it, and about all you can hope to do at the best is to get the farmers of the locality interested in that line of work. I found that in this district very few knew what a score card meant, and it seems necessary on the start to get the farmers together in their particular centres and get them interested in judging. I find that they very soon get interested and that in the places where Short Courses were held last year the farmers are very anxious to have others again this year, so much interested are they in the work. As a matter of fact, one of our most successful Short Courses was held at a place where they have not been able to hold an Institute meeting for a number of years. It is not our policy, however, to hold these courses in the same place two years in succession if accommodation can be found at any other good centre in that particular district, so that we spread the interest to other centres from year to year, and hope before long to have a good interest worked up in Short Courses throughout the whole district. Then, I believe, that it will be possible to hold fewer Short Courses and to hold some longer ones. It is quite possible that after a few years of preliminary work with these two-day Short Courses that a Course of from one week to two weeks might be put on at some central point for the whole district and be largely attended. However, it seems to me to be necessary in starting to bring these things as near to the farmer's door as possible, so that everybody in the district will have a chance to learn what these Short Courses are and what they can get out of them before they can be expected to go any great distance and stay any great length of time for anything of this nature.

My idea in running these two-day Short Courses is to work up an interest in the matter and lead to a longer course at which the different classes of stock may be taken up much more thoroughly, and at which I believe much more good will be accomplished. Until we have reached that point (and I do not think we have reached it yet) it seems to me advisable that we should continue to hold two-day Short Courses in Simcoe County.

PRESIDENT CREELMAN: I have just returned from attending some Short Courses on Stock Judging in the eastern part of the Province, a part of the Province which has not been in as close touch with the Experimental Union, and the Agricultural College, or the Industrial Exhibition at Toronto, or the other advanced agricultural organizations in the Province as we have in Western Ontario, and it was very much to my surprise, as well as to my delight, to see the immense interest taken in Short Course Stock Judging in the towns of Winchester and Lancaster. They had as many as four hundred people out at the meetings, listening to the work of men like Mr. Arkell, of Ste. Anne de Belleville, and Mr. C. M. McCrae, of the Dominion Department of Agriculture, and our own Prof. Day, Mr. Bailey and others of us whose privilege it was to attend these meetings. To see these people sit from eight in the morning until late at night listening to addresses on Live Stock and Seeds was inspiring. These meetings were organized by men like Mr. Metcalfe, and in this particular instance, by Mr. A. D. Campbell; and it looks to me, from the way these meetings were attended and the great interest that was taken in them, that Short Courses in Stock Judging have come to stay.

INFLUENCE OF A FIVE-DAY JUDGING COURSE.

BY D. MCKENZIE, LINDSAY.

The influence of a five-day judging course, though necessarily local in its purpose, presents some great possibilities as a factor in our agricultural extension work. The effects on the community may be summed up as follows: The indifferent man has his interest aroused; the man who honestly wants to learn more about his profession, gets a fund of information from the discussion and criticism of existing varieties, breeds, and methods; the College Professors and leaders in agricultural thought and practice throughout the Province are brought into close touch with the rank and file of the farming community; and lastly, it tends to create among farmers a higher appreciation of their profession.

It is evident, from the small percentage of farmers' sons in attendance at the Ontario Agricultural College, the poorly attended meetings of the Farmers' Institutes, the ragged, dirty appearance of many of the farmsteads of Ontario, that indifference exists to an appalling degree. New methods must be adopted to reach and stir these men, and a five-days' course will, if properly advertised and conducted, interest many of them; not perhaps from a genuine desire for knowledge, but because it is a new thing and the crowd is going.

To the man who is alive to his interests, the five days' judging course comes as a shower to a thirsty land. The discussion and criticism of common varieties, breeds, and methods, as carried on at the five days' course, gives him a chance to examine the variety or type under discussion at close range and to understand and remember points of merit or distinction as the case may be. He has a chance to compare his own practical experience with that of the instructors in charge, or with that of other men successful along the same line of endeavour, and to inquire into the cause or causes of difficulty and failure.

Despite the fact that Ontario has one of the best organized Departments of Agriculture in the world, there are many farmers who do not come directly under its influence. The Ontario Agricultural College reaches a considerable number, the Farmers' Institutes and other branches of the department reach a large

number; but to many farmers the Ontario Agricultural College and the Farmers' Institutes are mere names associated only with the spending of the people's money. These people are not interested in the work of the College, and never attend an Institute meeting, but they will attend a five days' judging course, and there they come in touch with the College Professors and heads of the various branches of the Agricultural Department in Toronto. They hear President Creelman tell of the work done by the Ontario Agricultural College, the College Professors discuss important phases of farm practice, and the superintendents of the Toronto branches discuss their efforts along educational and organization lines. They have their eyes opened, and what was once to them a sort of infernal machine for squeezing money out of the farmer, to supply lucrative positions for political favourites, becomes a real and benificent organization.

The indifference of many farmers to education and their conservatism in adopting improved methods, has led men in other callings to under-rate Agriculture as a profession. The small financial returns secured by many farmers as a direct result of obsolete and slip-shod methods have caused these farmers to look on their profession as a little inferior to all others. If we can arouse the indifferent man to see his need of improvement, satisfy the honest inquirer after knowledge, and bring our Department of Agriculture into living touch with every farmer in the community, the result will be greater financial returns to the individual farmer, more liberal education for the boys and girls on the farm, and a greater respect for Agriculture as a profession.

Mr. Geo. A. Putman: As superintendent of the obsolete system of Farmers' Institutes, and also having the honor of looking after these short courses, I thought it well for me to say just a few words. The short course at Lindsay, as Mr. McKenzie has stated, was a very large class, and next to the short course at the College was probably the largest in the Province.

In the County of Victoria they have just one in the winter extending over four or five days. I would like to hear something from Mr. Campbell, who has recently held two short courses in the east. The short course work is very popular. If we confine our work to stock judging altogether, we might derive a greater benefit and deal with the seed question in some other way. We have had a great many applications this year, more than our finances will stand, for short courses in various parts of the Province. The fame of the Lindsay course has spread, and we are getting requests not only from districts in which we have representatives but from many other points in the Province.

They want one in Halton, Elgin, and Kent, and in a few other counties. We believe that the short course will not only be a good thing in itself but will popularize the Farmers' Institutes. The Farmers' Institutes have a place yet in the Province of Ontario. The records of last year are considerably above those of the year before and the attendance was much increased. Some 260,000 people were reached last year, and we believe that with the Short Course and the regular Institute meetings, and the Farmers' Clubs, and the Women's Institutes, we are accomplishing a great deal more than formerly. But we still recognize the fact that the indifferent men and the careless men have not yet been reached, but we believe that the short course and the club will solve that problem to quite an extent.

Mr. A. D. Campbell: If there is any value in the short course any place, it is certainly in the country, where it is most accessible to the farmers. That seems to be one of the reasons why the short course is particularly pleasing to those who attend them. It is brought directly to their doors.

Another reason why the short course is more largely attended than some of the Institute meetings have been, is in the fact that it takes pretty largely the form of demonstrations. The short courses that were held last week at Winchester and Lancaster did not consist altogether of stock judging, although that feature occupied a prominent place in the programme. We had several lectures and addresses, and I cannot let slip the opportunity of referring to the work of W. H. Day on the drainage question. Prof. Day had with him a number of letters which he had received from men who had done underdraining according to a system which had been mapped out for them by men from the College, and from which drainage they received great benefit.

We received a great deal of assistance from local men. It was necessary that we should, because we had been in the county but a short time, and it was a very difficult matter to get up and down the concessions and do the necessary advertising unless we had local assistance. And the best assistance we received was from Institute men. One man particularly, the secretary, Mr. J. P. Fox, gave us more assistance than any other man in the county. I received several letters from men in various parts of the county saying that Mr. Fox had mentioned the course, and the writer would be glad to distribute the literature. When you get assistance of this kind, it is certainly very gratifying.

If there is anything that gives encouragement to men, it is to know that the very best farmers are with you. If it were not for that fact, sometimes you would feel inclined to drop the thing altogether.

Mr. Fox secured a number of members for the Institutes. The two were blended in one at the last course. We had upwards of five hundred men, and during the last day we were asked a number of times, "What are you going to have at the evening meetings?" We thought two evening meetings would be quite enough. I am not in a position to state the relative value of a three days' course and the five days' course, but no matter whether it is three days or five days, I am sure you will have a large attendance.

Mr. Buchanan: My modest friend, Mr. Steel, while listening to Mr. Putman's remarks and Mr. Campbell's, as to the value of the short course, said: "There is nothing so good for the indifferent man as the Club." (Laughter.)

THE ENCOURAGEMENT OF UNDERDRAINAGE.

By J. H. Hare, Whitby.

There are certain sections more or less throughout the whole county of Ontario, but chiefly in the northern townships, which call for a great deal of underdrainage, and until this land is thoroughly underdrained maximum production will not be secured. I estimate that in the northern townships approximately 35 per cent. of the land, and in some sections 55 per cent., is badly in need of underdrainage. The land in these sections is quite heavy, and to make matters worse from the standpoint of ease of construction of the drains, the land is very flat; but, on the other hand, under no other conditions will land so liberally respond to this practice.

For the last three springs the seasons have been quite wet. Such a condition as this on these flat lands makes drainage a vital problem. A very plain evidence of the sufferings endured was the predominance of the buckwheat crop throughout the district, a lack of uniformity in all crops, and a great area of the crops practically drowned out, as well as a far too great proportion of the land rendered absolutely incapable of cultivation.

In one case after the complete drainage of a very flat and heavy clay field, the farmer claimed that there was a difference of fully six weeks in the length of the season between the drained field and an adjoining undrained field. A further economic reason for encouraging underdraining is that there is a great deal more satisfaction gained by the farmer when working a well drained farm. On the other hand it is very apparent that on a poorly drained farm a spirit of discouragement and even discontentedness prevails.

As a general rule all farmers do not fully appreciate the value of underdrainage under conditions such as exist on this low, heavy land. If every farmer received a course in underdrainage such as is given at the Physical department at Guelph, I venture to state that there would be twice the amount of tile put in annually. It is, therefore, obvious that a great deal of educational work is essential.

One difficulty which has hindered the progress of the work has been the poor systems used by the ditchers in constructing the drains. The results derived are in consequence often nusatisfactory and tend to discourage the practice. Then again there are countless cases in which the ordinary farmer does not know the best system to follow, the right course to take, the best outlet, and numerous other difficulties which he must have settled before he will willingly invest his money in tile. A few of the more progressive farmers have applied to the county engineer for this information. This course is not only very costly but is not always satisfactory; hence the highly appreciated assistance of the county representative whose services are not only expert, but also very cheaply rendered, the cost being seldom over $1.50.

Up to date I have made in my county over fifty surveys, including open ditch work, underdrains and awards, each of which has taken from one-half to three and sometimes four days to complete. This work did not by any means all come into the office at headquarters. Applications came in very slowly at first, but when out in the field both personal and press advertising were resorted to in order to make the work public. The farmers themselves rapidly spread the news of the opportunity of securing the expert services of a drainage surveyor for almost nothing. In one instance where I had only two applications to attend to, ten surveys were completed before leaving the neighbourhood. In fact everywhere I went a number of men who, after hearing of my presence in the community, would make a trip to where I was working and personally make application for assistance in some difficulty.

The results of this line of work have been very pleasing indeed, in fact far beyond my expectations. Nothing has given me more satisfaction than the results from the work in drainage surveying. Then again, when speaking with a farmer, or with a number of farmers at a demonstration, requests are often made for information or assistance in matters other than those pertaining to drainage, which requests in all cases I am only too glad to comply with in order that I might extend the efficiency of the office in my appointed county.

GROWING CORN FOR THE CANNING FACTORY.

By A. P. McVannel, Picton.

Possibly, Prince Edward County produces a larger average of sweet corn than all other counties of the Province taken together. This is due to the fact that canning factories are more common in this district than elsewhere. At the present time nine factories are putting up sweet corn, and there is a possibility that two more factories will do so another season. However, the increase in average of canning corn or the amount of corn put up in cans will only take place with an increase in population and with the development of new markets. There seems to be no appreciable desire upon the part of the growers to increase the average of sweet corn for the factory. The problem seems to be to increase the production per acre. In this district where the canning factories are most common, dairying is still the most important industry and consequently much attention is being paid to growing feed for stock. There is a great increase in the average of silo or fodder corn for feeding. For farmers who are so fortunate as to be situated in close proximity to the factories, the sweet corn has been a very paying crop. They have been able to deliver their crop at the factory at little cost compared with the man who has to draw a long distance, and besides are afterwards able to take advantage of the by-products, husks, cobs, etc., from the factory. These by-products are more valuable than would appear on first thought, and especially the cobs are eagerly sought after by the feeders.

The growers and canning factory owners are not at all unanimous as to the requirements of a first-class canning corn. The grower is more concerned in growing a variety which will produce a large weight of ears and at the same time leaves him with a maximum amount of fodder for feeding. The canners want a corn that is sweet, deep in kernel, tender, and one that will cut off a high percentage of corn. The reasons for this are obvious, and the growers should, as far as possible, aim to meet the requirements of the canners. The canners object very strongly and rightly also to corn possessing shallow, poorly shaped, soft and mushy kernels, and ears of poor shape. The reason being that the modern machinery they use, will not cut the corn from the ears. This is equally true of poor shaped ears as it is of soft or otherwise poor samples. The canner is interested entirely in the ears and the quality of corn on the ears, while the growers are desirous of having a large bulk of fodder or stocks after harvesting a maximum yield of ears. As a matter of fact, the grower considers the fodder so highly as oftentimes to look for his profit from feeding the fodder.

Varieties. There are a great number of varieties of sweet corn grown for the factories in the districts where the latter are common. In regard to the varieties there is also a difference of opinion. Possibly the most commonly grown and among the best varieties to select from are the following: Crosby, Early Evergreen, Stowell's Evergreen, Old Colony, Hickox, Peck's Improved, and Pearce's Evergreen. New varieties are constantly being introduced which, so far, have not improved conditions materially. As a matter of fact they have been the cause of much loss and dissatisfaction for the grower. The claims made by seedsmen regarding the merits of many new varieties have been misleading. We do not wish to discredit the description given by seedsmen, nor to infer that any description has been given for the purpose of deceiving, yet the fact remains that if the grower bases his anticipations on the description he finds in catalogues and advertising circulars he is more than likely to be disappointed with the results he

obtains. Especially has this been true in regard to the statement concerning the date of maturity. Very often varieties described as "early" have proven so late as to be almost worthless; and several so-called medium varieties often fail to mature at all. A reasonable excuse may appear, however, for this apparent deception, in view of the fact that a large percentage of the seed is produced in a climate where the growers' season is considerably longer than in Prince Edward County, or in districts where canning factories are common.

Obtaining the Seed. In many cases the sweet corn seed is supplied to the grower by the factories. Much of the seed is imported by the factories from the States to the south, principally New York and New Hampshire. Increased attention is being given to the production of home-grown seed, and some few factories are giving this seed a preference. There is an uncertainty about imported seed as well as some dangers from planting home-grown seed. There is a complaint made against home-grown seed, especially in the case of the later varieties, that they have a tendency to grow flinty after a few years. This complaint is not justified, in view of the fact that one man has been growing and selecting the same variety without any change whatever for over twenty years, and has actually improved the quality of the variety as well as its productiveness. The complaint is only justified against growers who do not fully understand the principles of selection. The uncertainty of the imported seed is due to lack of vitality. Home-grown seed is not perfect in this respect. It is a fact that sweet corn is invariably of a lower vitality than any other kind of corn. As a general rule, and under present conditions, the lack of vitality is as true of home-grown as of imported seed; however, when special care has been given to curing and storing the home-grown seed, it is claimed to possess higher germinating power than the imported seed. There is a great deal of room for improvement of sweet corn for canning by selection. Much improvement has already been brought about as a result of selection practised by two or three growers in Prince Edward County. Most prominent of these are Mr. Pearce, of Wellington, Mr. Calnan, of Allisonville, and Mr. Peck, of Albany. The former has been practising selection with a single variety for over twenty years, and has produced the well-known and much-favoured Pearce's Improved Evergreen.

Many of the growers of sweet corn have, during late years, been saving their corn seed. They select enough of the best ears from the field and they dry these in the house very often over the kitchen fire, in the furnace-room, or sometimes in the sun in the open. Of these methods the only one advisable is to dry in the furnace-room. The air of the kitchen is invariably laden with moisture and steam, consequently the purpose of drying is defeated. Drying in the sun and open air is not sufficient in view of the large amount of moisture contained in sweet corn. The lack of some practical, effective means of drying and curing the seed is the greatest objection to the practice of every grower saving his own seed of sweet corn. The growing of sweet corn seed seems to be a special business by itself and one which should be practised only by those having proper facilities for drying and storing.

Vitality. Sweet corn seed is frequently low in vitality, *i.e.*, it has low germinating power. In general practice, if 90 per cent. of the seed planted will germinate, the grower is pretty well satisfied. Often, other things being equal, the vitality or germinating power of sweet corn is dependent upon the curing and care in storing. Furthermore, owing to the high moisture content of sweet corn, it demands our best attention, and in a climate such as we have, and in order to

maintain the vitality, it should be carefully fire-dried. Hence the growing of sweet corn seed is a business by itself, and should only be practised by men who understand selection, and who are prepared to give it the necessary care in curing and storing, and who have the facilities for doing the work. The seed grown by men who have the facilities for curing and drying is considered to be higher in vitality than imported seed, and this method seems to be the solution for the problem of obtaining satisfactory seed.

There is much room for improved methods of selection and breeding of sweet corn. The greatest need of improvement seems to be in the direction of *earlier maturity, sweeter grain, better filled and better shaped ears and kernels, and higher yielding varieties.*

HOW I HAVE STARTED WORK IN PETERBOROUGH COUNTY.

By H. C. Duff, Norwood, Department of Agriculture.

In opening a branch office of the Department of Agriculture, the appointed representative must work out his own salvation. His manner of procedure will naturally follow the course of least resistance. This course will be directed largely by the chief kind of farming in practice and to a limited extent by the situation of his office.

The office in Peterborough County is located in Norwood, a village having a population of eight or nine hundred. Owing to the absence of a market, and to the proximity of villages almost as large as itself, Norwood attracts only a limited number of farmers. This fact early indicated a narrow scope of usefulness for the office, and necessitated the grasping of every opportunity that offered a means for making known the nature of our work. However, the suitability of the location is not questioned since there is no other that offers a greater field for advancement.

In accordance with what seems to have been the customary practice with all the representatives, we spent the first few weeks preaching the new gospel of agriculture wherever we could get a hearing. This we found to be very necessary, because few, if any, understood the nature of our work; in fact, the majority of the people had never heard of the new movement. The prevalence of noxious weeds and the need for underdraining, which we noted during our advertising tours, suggested two problems that promised to arouse general interest. In this our calculations proved to be correct since the two problems have been a basis for finding a greater field of usefulness.

With the arrival of our surveying outfit, a sufficient number of requests for assistance were received to warrant a promising start in the work. A drainage demonstration, conducted by Mr. W. R. Reek, who was on a tour through Eastern Ontario for the Physics department, aroused intense interest, and was the subject of much favourable comment in all the county papers. This particular phase of our work again received first consideration in the eyes of the farmers at the Fall Fairs where we had an exhibit.

The exhibit at the Fairs was somewhat small, since we had no plots from which to secure supplies, but the number of visitors greatly exceeded all expectations. This we attributed largely to the fact that our display was in a tent where it was the sole attraction, and where everything could be kept clean and tidy.

The principal problem facing the Peterboro farmer is undoubtedly that of improving the dairy herds. The county is admirably adapted for dairy farming, but the average farm is still supporting a few cows that are "star boarders." The men who were sent out this year to speak at the annual meetings of the cheese factories have done excellent work in forming Cow Testing Associations, and in reviving interest in those that were in existence. The individual records of the cows invariably result in better and more economical feeding, and create a desire for more knowledge on methods of cultivation, cropping, etc. To satisfy this desire, and to encourage a general improvement in agricultural practices, there is undoubtedly nothing more efficient than the Farmer's Club. Two very promising clubs are now in operation, but no more will be organized this year, since our experience goes to prove that permanency is dependent upon careful preparation. What we are aiming to accomplish is to awaken a desire in many sections for a club, and in another year we will give considerable time to the advancement of this particular feature of our work.

The High School end of our duties has limited the time that might otherwise be devoted to the farmers, but we do not for a moment claim that the hours spent with the class have been a hindrance to general advancement. We are now advertising a six weeks' course of lectures in Agriculture for young men. These lectures, to commence on the first of February, have brought forth a number of inquiries, and give promise of becoming popular. We consider that the prime object of any lecture that we prepare should be the instilling of enthusiasm in the minds of our hearers. Where enthusiasm is aroused, a desire for knowledge and advancement naturally follows. And nothing is more conducive to advancement in any rural community than the presence of an ambitious young farmer who is ever on the lookout for new ideas, and who is quick to adopt the same when they give promise of furthering his interests.

HALF A YEAR IN NORFOLK COUNTY.

By P. E. Angle, Simcoe.

The County of Norfolk, in common with all other counties, has its own peculiar problems to grapple with. Mr. Zavitz, in his report on co-operative Forestry, has no doubt told you of the sand lands of the county, which have been robbed of their forests of giant pines, and which are now said to be so poor that you cannot raise your voice on them. Part of these lands is only suitable for reforesting, but I believe that certain portions of them which are commonly considered to be worthless for farming purposes, and are being abandoned, are simply the result of a system of farming which is nothing less than robbery, and which is the more insane because of the fact that the robber robs himself.

In the great majority of cases on these lands, rye is grown year after year. In many cases the owners have given up trying to seed the land to grass because they say they cannot get a catch. Of course, they cannot when they burn their rye straw each year as soon as the threshing machine leaves the farm, and sell the rye at first opportunity; and this is done in many cases. But it is not impossible to grow the legumes on these lands. Only last week I saw a wheat stubble which had been seeded down with clover, but not a sign of clover was seen except on the hills which are supposed to be the poorest part of the field; but the reason for this

was evident. Scattered over these knolls was a fair covering of manure and wherever a particle of manure could be seen the clover was growing nicely. I know of two farms where a splendid crop of cow peas was grown and plowed under this year on these light sandy lands. I know of different orchards which have been planted within the last two years on land that was considered to be blow sand, and they were growing nicely this summer. Therefore, I believe that many of these farms may, by judicious cropping, be brought to a fair state of fertility, and made to yield profitable returns in certain branches of agriculture.

Prof. Graham tells me that the soil and climate of this section is almost ideal for poultry culture, and surely with cheap land and the present high prices for poultry produce available, this should be a profitable branch of agriculture. Of course it will require a considerable amount of care and expense and time in order to obtain results, but with land at $5 to $10 per acre it surely is a practicable proposition.

But the land in the county of Norfolk is not all like this, and the farmers are not all farming in the way mentioned above. There is land in the vicinity of Simcoe worth $150 per acre, and men farming it who are experts in their business. Among these farmers there is being successfully developed a system of co-operation which has thoroughly convinced me during the half year I have spent in the county, that the salvation of the farmer lies in co-operation; and although I know that the subject is becoming almost hackneyed, I feel that its importance warrants my mentioning briefly some of the things which it has done for the farmers of the county and for the county as a whole.

Six years ago the apple crop of the county was meagre in quantity and poor in quality. Though an occasional orchard was producing a small amount of fruit of fair quality and yielding perhaps a small profit, under moderate treatment, the average orchard was a dead asset to its owner. To such an extent was this true that many men were cutting their apple trees for firewood. Not only was this true, but slowly and steadily the farms of the county were being abandoned. All branches of agriculture were backward.

In the winter of 1906 the Norfolk Fruit Growers' Co-operative Association was organized with a membership of seventeen. The members began to co-operate to produce better fruit. Their old, unsprayed, unpruned, uncultivated, unmanured, unprofitable orchards began to be sprayed, pruned, cultivated, manured, and profitable. The membership increased to fifty-two in 1907, to one hundred and fifty-two in 1908, and to one hundred and eighty-eight in 1909, and the quantity of apples in the county suitable for barreling has been doubled in the same time. Then by co-operating to put up a uniform pack of fruit and by dint of diligent advertising, chiefly by putting their fruit before the public, the price received for apples has been likewise doubled.

As a result, the one hundred and eighty-eight members of this Association will receive about $60,000 for their apples this year. Orchards will net their owners from $2.50 to $6.50 per tree. I know of one orchard of one and one-half acres which will net $440, and another of five and one-half acres which will net $1,000. No more orchards are being cut down, but thousands of trees are being planted each year.

Less farms are being abandoned. The value of farm property has increased enormously, and outside capital is being quite freely invested in the farms of the county.

But of far greater importance than all these is the impetus that this co-operation has given to other lines of agriculture, and the effect it has had in extending co-operation among the farmers. The members of this Association and their neighbours outside have seen what can be accomplished by scientific methods and intelligent co-operation in orcharding (which, by the way, forms only a small part of the agriculture of the county, since only 10,201 acres of the 271,394 acres of cleared land in the county is devoted to orchard purposes), and they are beginning to awake to the need of a careful study of and the almost unlimited possibilities in any branch of agriculture in which they may engage. It is not unusual to hear a farmer say: "I have only been dabbling at farming till just lately. I am just beginning to farm now, and I want to learn as much from the other fellow as I can."

Last spring a farmers' club was organized at Simcoe with a membership of one hundred. They are just now resuming activity for the coming winter, and in their outline of work is the perfection of a plan of co-operation in growing and selling potatoes. And thus the good work spreads.

Now I would not have you think that the way of the co-operator in Norfolk has been nothing but pleasantness and that co-operation there is perfect. The association referred to has had its drawbacks, the chief of which has been the result of the old, old story of petty jealousies among members and a lack of faith in one another. These things are being gradually overcome, however, and as each difficulty is surmounted it reveals once again the fact that for successful co-operation a high sense of individual responsibility among the co-operators and competent management of the business are the prime essentials for success.

THE CHAIRMAN: Co-operation among farmers, especially in the fruit business, has done a lot for the farmer, and I believe that is the reason they organize Farmers' Clubs. It is owing to the success of the Fruit Growers' Associations that the farmers are beginning to see that there is something in co-operation.

PROF. ZAVITZ: I am sure we are very much interested in this report from Mr. Angle. Although he has not been very long in the county of Simcoe, he has done considerable work, and has much more before him. When at the Simcoe Fair in Norfolk County, some four or five years ago, I met Mr. Johnson, who drove me out to an orchard some three or four miles from town. I had heard something about this orchard and I was pleased to have the opportunity of looking at it, as I understood the orchard had been for twelve or fifteen years allowed to simply grow wild and had produced practically nothing. But Mr. Johnson took it over, cultivated the land, trimmed up the trees, put in a cover crop, and in the spring sprayed the trees; and the next year, when I was there, the orchard was simply loaded with the most magnificent crop of apples, nearly all Spys. There was scarcely a wormy apple to be found.

I remember going into another orchard just across the fence that had not been cared for, where the man did not believe in spraying, and it was certainly a great object lesson to compare these two orchards. In the one it was difficult to find an apple that was not wormy, and in the other it was difficult to find a wormy apple. In one orchard the packers were busy at work and nearly all the apples could be put in the barrels as first-class, whereas in the other orchard a great many of the apples were being hauled to the evaporator.

Having seen this, I can appreciate more readily some of the statements Mr. Angle made this morning. They are finding out that some of what they call

waste land, is suitable for fruit, and I believe we will hear a great deal from Norfolk County in connection with fruit-growing.

PROF. HUTT: Mr. Angle has not told us anything about the school work at Simcoe. I am sure he must have some valuable experience in that connection.

MR. ANGLE: The reason I did not speak about school work was because I did not wish to talk about anything that I had not done. I have not done much in the school work. I advised the pupils to take the regular course in the High School, except Latin and Greek, which periods I fill in with Agriculture, and you will be surprised to hear that five boys, the eldest being fourteen and the youngest eleven, who had just passed the entrance, took up the work.

One of the High School teachers patted me on the back and said, "You have my sympathy, old man, trying to teach these fellows how to farm." I told him I did not want to teach them farming, but I would try to combat that influence of the High Schools which tried to take them away from the farm. I took the five boys to the Horticultural Exhibition at Toronto, and they were so delighted that they are going to the Fat Stock Show.

I feel very optimistic with regard to the possibilities of the school course. We are starting where the influence is bound to spread. Every one of the families of these children wrote to me and said the boys would rather spend the time at their agricultural studies than any other. One of the parents told me the other day that he had two boys going to the school, one taking Agriculture, and the other boy thought he was missing something, so he intended starting Agriculture after Christmas.

I teach from three to four on Monday, Tuesday and Wednesday, and between two and four on Thursday. It does not in any way interfere with the regular programme at the High School, but it interferes with my time. I have a considerable amount of office work. Four different boys in the High School who are not taking up Agriculture have asked me about the course, and one of them is now selecting weed seeds in order that he may take it up next year.

PROF. HUTT: I have been pleased to hear Mr. Angle's address, and to know that he has done such a large amount of work in the short time he has been in the county. I have judged at the Exhibition in Simcoe a number of years, and I do not know of any county in the Province that has made the strides Norfolk has in the last five or six years.

I was in Mr. Johnson's orchard the first year he sprayed his fruit trees, and I can corroborate all that Prof. Zavitz has said. This matter of improvement is all left to one or two live men, and they have to regenerate the work in the whole county. They have a number of bright men in Simcoe: Wyner, the horseman; Groff, the plant breeder; and Johnson, the fruit man. A few of these men have kept things going there, and they have brought Norfolk right to the front.

MR. ANGLE: If there is any success in this school work, it is largely through the preliminary work that was done by James E. Johnson, and the impetus that had been given to the farming community through the work started by him.

A MEMBER: I was sent down to Norfolk County last week to interview Mr. Johnson, and he informed me that a great many people have been planting orchards lately, and a great many people were coming in to invest in orchard lands. He said there were many inquiries for lands for sale. The Co-operative Fruit Company intended to have a land exchange in connection with their Association.

THE POSSIBILITIES OF AGRICULTURE IN DUNDAS.

By A. D. Campbell, Morrisburg.

Dundas, although it had, according to the last Bureau of Industries Report, 30 per cent. of uncleared land, is one of the good counties of Ontario. Of its 237,000 acres, 45,000 acres were swamp or slash land, and 28,000 acres were wooded. But the next report will show a different percentage, because the fires of 1908 cleared thousands of acres of slash land, while the plow of 1909 has made large areas ready for the seed.

In so far as large municipal drains will drain swamp land, much of this is already drained. Although it is in some places mucky in nature, in but few instances is the muck deep, and when science has solved the muck land problem, this land will be valuable.

Anything that Dundas may have lost owing to its uncleared land is more than made up for by its large areas of extremely rich and fertile soil, which is for the most part a very deep clay or clay loam that, under average conditions, seems sure to produce excellent crops.

At the present time, by far the leading industry is dairying. In some sections the raising of hogs and horses is extensively carried on, but nearly all agricultural effort seems to centre about the production of cheese and butter, and for its size, Dundas leads all other counties. This does not mean that the Dundas farmers are highly skilled dairymen. There is much room for improvement, and the day is coming when the dairy output will be much greater than it is to-day. A correct knowledge of the cows' milk production, a careful selection and breeding from milking strains, and proper feeding methods, comprise the solution of greater production here as elsewhere. With better milking strains and better feeding, the possible dairy output in a county with such a rich soil for producing feed, is enormous.

But closely wrapped up in the agricultural possibilities of any county are its agricultural problems, and Dundas has them. They are: the need for Underdrainage; the summer feeding of Dairy Cattle; the Weed problem, and, most serious of all, the mad desire of the boys and young men to leave the farm.

With reference to drainage, it may be said that the surface of the soil might be described as level, but not flat. So level is it that thousands of dollars have been spent in constructing immense ditches to carry away the water. These ditches serve as excellent outlets for underdrains, and only when they are used as such, will they give full returns for money expended. But little underdrainage has been done, and of its benefits the people, from actual practice, know but little. In addition tiles are not made at any nearby point. Moreover, the people are tired of paying for ditches, and hence are loath to expend more money for drainage. Such is the drainage problem in Dundas.

The question most frequently asked me during the past summer was, "How can I best feed my cows during the months of July and August?" By growing large quantities of corn the people can carry through the winter more cattle than they can feed during the summer. And right in this connection comes up the question of corn-growing. Although large quantities are grown, no Dundas farmer feels that he has yet discovered the best corn, the best method of growing it, or the best method of making ensilage. All that I have to say is this, that from a corn census which I have made for the Ontario Corn Growers' Association, and from actual observation,

I have found that the varieties and methods are many and varied. Much of my time during the next few years will be devoted to studying the growing of corn in this county.

Then the Weed problem is a vital one. Dundas has perhaps not so many weeds as some other counties, but it has in immense quantities a few of the worst.

In my estimation what should most seriously concern the Dundas agriculturist to-day is the migration from the farm of its boys and young men. In no part of Ontario have I seen this so marked. It is with this question that I, firstly as a friend of the farmer, and secondly as a representative of the Ontario Department of Agriculture, would endeavour to cope, and in grappling with this problem more than with any other, would results be slowly obtained.

The outlining of these problems may seem to have but little connection with agricultural possibilities of Dundas, but the relation which I, as a representative of the Ontario Department of Agriculture, bear to these and others, is the relation which I bear to the Agricultural possibilities of the county.

Dundas with its fertile fields and industrious people will, with the adoption of the best methods of intensive farming, become a county of unbounded possibilities.

THE CHAIRMAN: I think there are a great many counties in this Province where they need better underdraining. The farmers as a rule do not know the value of underdraining, or if they did, they would not be backward in expending the money in buying the tile to underdrain their farms. I firmly believe it will pay 25 per cent. on the investment the first season.

MR. ROBINSON: I have heard a great deal about Dundas County since I have been here. I am a man from Dundas and I know considerable about that county, and I think Mr. Campbell's paper is a good one.

An immense amount of money has been spent in opening up drains through the county of Dundas, which is a level county. The trouble now is, that they have gotten sick of the drainage business, and if you mention a drain the farmer is up on his dignity at once. They have gone so far with draining that they have gotten to a point where a little more will make it useful. Having so many large drains they will be able to put in underdrains and get the benefit that they could not secure in any other way. The money spent so far has been practically wasted unless they go a little farther and make it complete.

I have found that the tendency of the boys to leave the farm is quite prevalent. We have some good schools down there, and we are very close to McGill and Queen's Universities, and the people find very little trouble in giving their children a good education. Some of the young men have gone out into the world and have made a great success and they are held up to the other boys. A number of them go to college, and become doctors and lawyers, and the others, who are a little stupid, stay on the farm, and they are thought to be insignificant sort of men who are not worth bothering about.

I expect in a few years that Mr. Campbell will get the people to realize the importance of agriculture, when they will go back to farming in Dundas County, which will become one of the most progressive counties in the Province of Ontario.

PRESIDENT CREELMAN: I would like to say a word in reference to the drainage proposition, which has been suggested to us by Mr. Campbell and Mr. Robinson. I see that you have no provision for a discussion of this problem, which has been agitated so much during the last three years. Three years ago we were enabled to get a small grant from the Government so as to put on the road two or three undergraduates of the College who would go to any man's farm in the Province, and for the mere expense of his railroad trip, which is one cent a mile, and for his board

while with the farmer, he would give the farmer a complete drainage plan of his entire farm that would enable him, without the expense of an engineer, to thoroughly underdrain his own farm without any further assistance from any person on the outside.

With the help of only two or three young men, we have been able to drain 32,000 acres in the Province of Ontario, and we have been able to increase the output for tile from a decrease in 1905 to an increase of over 200 per cent. since we took hold of the work in 1905 up to the present time. Last year twenty-nine millions of tiles were produced in the Province of Ontario and shipped to the farmers.

While at the Winchester meeting and the meeting in Lancaster, we discussed this matter with the farmers of Dundas and Glengarry, and from the lowest to the highest estimate, the farmers in the Province of Ontario would be benefited by draining to a very considerable extent, the estimates being from 15 per cent. to as high as 60 per cent.

THE IMPROVEMENT OF COUNTRY ROADS OF ONTARIO.

Suitable Material, Method of Construction, Proper Maintenance, Etc.

By A. W. Campbell, Deputy Minister of Public Works, Toronto.

I am sure it is quite unnecessary for me to emphasize the importance of better roads to this Experimental Union. It might be important, however, for me to refer to the fact that so far as roadmaking is concerned, to my mind, it has been a series of experiments in this country, extending over nearly one century, and I have reached the conclusion that the time has about arrived in the history of Ontario when we should cease experimenting in this particular, and that we should try to have some reasonable standard of roadmaking for each county and township in the Province.

It is a well known fact that there are a few principles underlying the construction of roads, which, if we are to make a success of our expenditure of money and labour, must be closely observed. You all understand the absolute importance and necessity of observing the principles in connection with the work in which you are especially interested, and in the building of a road as well as in the construction of any other public work, there are principles of construction which must be observed if success is to be achieved, and it is useless and hopeless for us to go on as we are still doing in many of the municipalities of Ontario. You are aware that notwithstanding the fact that in the last few years about one-half of the municipalities of the townships of the Province have commuted or abolished the system of statute labour, yet in a great majority of townships that system still prevails. And if those who have charge of this labour were in a position to concentrate that, so as to produce its value in actual work, not in the exhaustion of time and effort, what an enormous work could be performed with the labour that is taxed against land in this respect.

Statistics collected by our Department show that there is a little over a million days of statute labour still performed on the roads of Ontario. When that million days of labour is not concentrated but scattered, as it is, although these men do work faithfully, nothing but temporary work, patching and repairing can be expected. In addition to that, we have cash annually raised by direct taxation, making in all about $2,100,000 or its equivalent, spent upon the roads of Ontario annually. The clerks' returns reported at our Department show that in the last ten years there has been spent nearly $21,000,000, or its equivalent, in labour on the roads.

Now, I have frequently stated that if this labour and money were given to me and I were placed in a position to concentrate it and utilize it as I saw best under fixed plans and specifications, I would undertake to macadamize in a first-class manner every rod of road in Ontario upon which the expenditure has been made in the period of ten years. If it has not been accomplished, then why should we not ask the reason why more has not been made of this money and labour?

The work has been carried out in an indefinite, shiftless sort of way. Pathmasters and road commissioners are being changed every year, and they do not get a sufficient opportunity to learn even a little of something about the principles of roadmaking before they are set aside and others placed in their position.

If we had some trained pathmasters or trained road commissioners, and they were placed in charge of the work, and their positions were made secure, so that they could make plans of the roads of the townships and state what improvement is required on each of these roads, an improvement that would be in keeping with the requirement of the traffic, and that they could commence at a certain point and utilize the labour and the money as far as it would go each year in doing some fixed and definite work and extend that from year to year, in a very, very short time we would have a long mileage of first-class roads in each township.

Under the county road system in the county of Prince Edward, in the last two years, they assumed about one hundred miles of leading road in that county. That county now concentrates the expenditure that used to be placed upon one hundred miles of road, and they commenced at a certain point last year. They first equipped themselves with a complete outfit of road-making machinery. Without first-class implements you cannot do first-class work. They purchased regular crushers and steam rollers and last year they macadamized twenty-two miles and this year a little over twenty miles, making a stretch of forty-two miles of road in two years' time. Fancy what that county will accomplish in the next ten years! Fancy what they would have to-day to show for their expenditure if they had commenced ten years ago!

I do not believe it is a question that is going to disturb the people as to how the money is going to be raised. We are raising an enormous amount of money now, but the unfortunate part of it is the way that money is being handled. We want to work economies in connection with our municipal taxation, and here is where the members of this Experimental Union with your special training along these lines and with your ideas of how carefully and cautiously matters in general should be studied in order to produce the best results for your labour and expenditure, can help. There is no question of so much importance to the people to-day as that of the improvement of the roads, and there is no question in which you can afford to devote some of your special time and some of your training to better advantage than to the laying down of capable and competent plans for the improvement of our roads.

Reading an account of what you are doing here, while coming along in the train this morning, I noticed that you had been carefully studying the wisdom of underdraining in connection with your farming operations. As an engineer of a good many years' experience in matters of drainage, I can only say that this is an exceedingly important matter in connection with your farm operations. It is, as I think, the basis of all farming operations. Unless land is thoroughly and carefully and perfectly drained so that the pores of the soil may be thoroughly and fully opened to receive the benefits that result from the falling of the rain and from the nourishment of the melting snow, it is useless for you to attempt to farm successfully that particular land. Tile draining and its importance in connection with farming cannot be over-estimated. Tile draining of the foundation of the ordinary road is the first principle that must be observed in road-making, and unless we do see that the foun-

dation is thoroughly and properly drained, it is as useless and as futile for us to attempt to build a road as it would be to attempt to put up a first-class building on a wet and yielding foundation.

In fact the principle of road-making is simply boiled down to the question of drainage. It is the soil after all that carries the load. The natural soil, the clay and the sand which forms the foundation for that road has to carry the load and that should be drained. Where the land is porous or wet or boggy, it may be necessary to resort to tile draining. Place a drain underneath the roadway where there are holes or boggy places, sandy or moist spots, so as to remove all the moisture and create a hard foundation. It matters not what you put on the surface, whether it be gravel, broken stone, vitrified brick, or asphalt, if the foundation is moist, the frost enters that foundation, acts upon that moisture and when the frost disappears in the spring the foundation is left loose and unsuitable, and the crust that has been created on the surface is simply a crust resting on a yielding bottom that will crack, break, and rut under very slight traffic.

The foundation is the first thing to be obtained. The placing of the surface material, the gravel and the stone is the last subject to be considered. The great majority of our roads for years to come will necessarily have to be earth roads, and in many instances where these roads are properly drained and cared for, they are as useful and as serviceable for the little traffic that passes over them as an asphalt pavement; but in a city where the traffic is extremely heavy, such a road would not do. We should classify these roads according to their importance. We have what we call leading roads, the main arteries leading to the city. We have other roads that serve only neighbourhoods and are used only by occasional teams. Then there are the division lines and back concession roads that are used by only one or two farmers, and not at just the season of the year when roads will be injured by travel. If these roads are properly *drained* and *crowned*, and attention is given to their maintenance, they will be quite serviceable roads, and can be made what would be considered ideal roads for ordinary traffic.

When we reach the next class of roads where the traffic is a little greater and where the roads are used during all seasons of the year, then it is necessary to resort to a covering of some material that will resist the wear, and that will shed the water and make a hard, smooth, wearing surface. That is why the gravel or broken stone is placed on the road. Ordinary land gravel is composed of 50 per cent. of sand, which is useless in road construction and should be eliminated. The best practice suggests that all gravel should be placed through crushers where the larger stones are broken and where the smaller stones are reduced to cubical pieces so that they will bind together and where the sand is abstracted and nothing but clean stone is retained for the road bed. Gravel of this kind is almost equal to crushed stone. Where gravel is not plentiful, we believe then in using crushed stone of the best quality that can be obtained within reasonable distances of the work. It is not practicable for us to always be able to select ideal road-making material for country roads. Trap rock is supposed to be the best. It has a hardness and toughness that will resist wear and last a great many years, but trap rock is only to be found in certain sections of the Province, and the cost of forwarding it and distributing it through the country would make the price impracticable. We have to use the best material available. There are many localities unfortunately situated in the Province, which have neither stone nor gravel for use on the roads and which are under the necessity of importing crushed stone by rail. The cost of such roads is not expensive in the vicinity of towns and railway stations and in view of the greater durability of crushed stone, it is frequently desirable to use that

material, particularly when it can be shipped in by rail close to the stations even where gravel may be obtained. The greater strength of crushed stone and the greater durability will in the end repay abundantly the additional cost.

In connection with gravel roads or broken stone roads, I wish to say that it is useless for us to go on hauling and dumping gravel, spending our time and money in putting on roads gravel that is not suitable for the requirements. The man who is charged with the making of the roads in a township should have some scientific knowledge of these things, so that he can pass upon the quality of the material and say how it should be best treated so as to make it most suitable for the work in hand. Prepare the material which you have on hand in the most competent way to make the most of it. This is where the experimenter can inform himself to the best advantage and the fact of his constantly being in touch with the work will, in a very short time, make him a most valuable official to any county or township. Every township should have in its employ one man of this description who will plan in a general way the work of road-making, and who will say what drainage should be provided and who has sufficient scientific knowledge to handle an ordinary drainage level and who can take levels, plant the stakes, map out the work and see that proper tools are provided and that the fall for the water is down hill and not to make the ditch first to find out whether the water will run to the north or south.

Take the proper levels and see that you have the proper directions before you commence the work of construction and then arrange to have the outlets made so as to dispose of the water in the smallest quantities, never leading it a long distance along the side of the road that will fill in and obstruct its flow, injure the fall and ruin the road.

Drainage is of the greatest importance, and if I should only attempt to emphasize this one question to-day, I would leave you to consider the question of how broken stone should be prepared and how it should be applied. I would emphasize drainage as being what I believe to be an exceedingly important matter in connection with road-making. We can make ordinary clay roads by proper drainage, and proper grading and shaping and attention.

First-class serviceable roads for the ordinary requirements of certain districts throughout the Province can be made in this way, and only the more important roads really demand the application of gravel and broken stone. The first thing in this road problem is to get the council to look upon it as an important matter, and after they have decided on their plans, they should place the work in the hands of a man who has sufficient scientific knowledge and training to undertake the work and see to it that whatever expenditure is made each year, whether of labour or money, that it should be directed along lines of these particular plans and that every year's work, every day of labour, and every dollar of money should be made to show its value in permanent results. The plans which we follow generally in designing for the township is to classify the roads under three heads: 1. The leading roads, upon which most of the traffic passes; 2. The neighborhood roads leading on to these and subject to the traffic of the particular neighborhoods; and 3. The concession lines. The most important road should be graded to the width of twenty-four feet, the second class twenty feet, and the third class eighteen feet.

Experiments have taught us that these are about the proper widths to be used in connection with township work. After the foundation has been drained carefully, the road should be crowned so as to shed the water from the centre into

the ditches. That crown should be about one inch to the foot from the centre to the edge of the ditch. That is where the road is twenty-four feet wide. The fall from the centre to the edge of the ditch should be twelve inches.

After the road has been graded, it is advisable to pass a heavy roller over it so as to compact it thoroughly before the traffic is allowed to go on. If the traffic is allowed to go on the loose earth, the first team will rut it and after that the traffic is pretty well directed into that rut. Water is held there and the injury commences. It is an excellent practice to roll with a twelve to fifteen ton steam roller. Horse rollers weighing from six to eight tons are being used with a great deal of success. A steam roller should be in possession of every township municipality in Ontario where road-making is being done.

You cannot do this work properly without proper implements. If township councils would defer their money to the purchase of a complete outfit of machinery for the first year, they would be further ahead than by going on in the usual way without implements to do the work properly. Do not make the great mistake that many councils have made in flying away at once to purchase machinery without making provision for its operation and maintenance, and without studying who is to look after it. In many instances these machines are placed in the hands of inexperienced men. A standard should be established that could be followed to advantage and then the money that is being appropriated will be appropriated to useful purposes.

In conclusion, let me urge that in our modern road-making of to-day we seek to find and employ experienced men in this work; that we use modern road-making machinery; that we select our material with care, that we drain thoroughly, that we grade in a workmanlike and permanent way, and that throughout all we seek economy in efficient management of men and teams in this work.

THE EX-STUDENTS OF THE O. A. C.

By G. S. Henry, Oriole.

I am very pleased to be here this evening, although not so pleased to have the onerous duty of responding for the large body of ex-students here, and those who are not here to-night; but with the gift of office there also goes certain duties. While sitting here I was wondering whether it would not be possible for the President of the College to extend this banquet over a couple of days, whether, if he could do this, we would not have a better Union. I have been wondering what was the cause of the increase in the attendance at the different sessions which we have been holding for the last two days; the increase seemed to be very rapid, and I was very much surprised at the large number we had in the latter part of this afternoon. I was somewhat at a loss to know, though I am an old student. I have realized since sitting here that after all we were leading up to the climax here to-night. I think, Mr. President, if you can only extend this banquet in some form or another, give a little of the good things to us, and so spread them out, we might have a better attendance at our Convention in its earlier stages.

While sitting here I cannot help looking back over the years that have gone. Although they seem to have been increasing there are not so many of the Old Boys here this evening as I have been accustomed to meet—not so many here possibly as there were a year ago. Possibly the numbers of students and ex-students of more

recent years are increasing so rapidly that those of other years a little previous seem to be diminishing, although there is not the same reason, there is not the same drawing for the ex-students as years go by. The older men feel that their old classmates are not as likely to be present at the Union, and after all that is one of the chief reasons that we come back. At the same time, I have reason to be glad that I do come back. I always find some fresh inspiration when I come back to the old College halls at the O.A.C.

Then again, I think of this gathering here to-night, and as one of the reasons of its size and of its importance, I am led to say that a great deal of it is due to the ex-students of this College. I am speaking largely now of the ex-students of from fifteen to twenty years ago. They were the men who did the pioneering for our College, they were the men who went out and spoke through the country, up and down the concessions, championing the College, when to be a student of the O.A.C. was not as popular as it is to-day, and it was not as popular with the Government as it is to-day. A great deal, I say, is due to the work of the old boys of fifteen and twenty years ago, their loyalty to the College made such a College as it is to-day possible. But I don't think that they have ever forgotten their duty, even the more recent students have not forgotten their duty. We all seem to be loyal; we are all students at heart. It appears to me that the term "ex-students" is a very apt one. He was a genius that first suggested that word for the graduates of the O.A.C. I don't know why, but it always appeared to me that the O.A.C. students always were students after they had left the College. The word "ex" merely suggests outside of, away from, the College, but they are still students there, always students at heart. The term is very much in advance of the term "graduate." A graduate seems to leave his institution, and that is the end of it, but with us here we remain students. The oldest of us is as young a student as any here, so far as ambitions are concerned. But I think we as an ex-student body are reminded that we have not accomplished all that we can yet accomplish. We have realized surely this afternoon from the address that the Deputy Minister gave us on the work that is being done over in the little country of Sweden, that, after all, while we seem to have been progressing very rapidly, we have not yet reached the standard of producing wheat to the amount mentioned. We have yet something to learn, and surely it is for the ex-students and students to keep behind the College, to back up the Legislature in giving more liberal grants to the cause of agriculture in the Province.

There is another thing I would like to suggest before I sit down, and that is, to the Minister of Agriculture as representing our interests in the Cabinet of the Province of Ontario, the desirability of developing the residential side of the student life here. I do not know of anything that struck me so forcibly in the few months I was privileged to spend at the College here. It had been my privilege to take a course in Arts, at Toronto, and I thought that I got along there very well, that I had become well acquainted with a large body of students, and they had a large influence on me; but I am free to say that in the six months I spent in the College residence here I got better acquainted with the hundred boys or more that were there in that six months than I had in my own instance in my whole four years' term in the University of Toronto. I think that it is a very important phase of student life, the residential side. We cannot press it too much to the front. I understand they are not all residential students now, and I am sorry for those who are outside, who never can have the advantages and privileges of a residential student. They can never really fully get into the spirit of the College as do the residential students. I feel that I am speaking for the ex-

students when I say that the Government would be doing a wise thing in spending more money in extending the residence, so that all students who come here in the future may, as far as possible, be housed and taken care of within the college walls itself. (Applause.)

I have possibly spoken long enough. We have some of the men who are representing the large interests of the Province with us to-night, and we are anxious to hear some suggestions from them, and I feel that they are only too willing to do all that they can for agriculture if the people will only back them up. That is always the story they tell us when we go there. "Educate the people, and we will give you what you want." It is for the students and ex-students, therefore, to educate the people of the Province to the interests of the College here. I thank you on behalf of the ex-students for again extending the hospitality of the College to us this evening.

ADDRESS.

By Hon. James S. Duff, Minister of Agriculture, Toronto.

Until I heard Mr. Henry I had intended to use the word "graduates" and "undergraduates," but after listening to what he had to say with reference to the term I felt that possibly I was well-advised to follow his line of thought in reference to it. Permit me to say that it affords me very great pleasure to be with you to-night. It is the first time I have been privileged to meet with the students, the ex-students, the staff, and those who are associated with you in your work here at your annual banquet, and before I say a word or two in another line there is a thought that has occurred to me that perhaps I ought to tell you of. I have been at banquets, and I have been at gatherings where we have had great numbers of young men, but I think I am safe in saying that I have never been at a banquet in my life where there has been the same order and the same good nature displayed on the part of the students as there has been displayd here to-night. (Applause.) I can very well understand why President Creelman in his opening address should have paid such a compliment to the gentlemen who had been associated with him in his work on the staff of this College. I can well understand that he was paying a compliment that was not only worthy, but perhaps more than worthy, because if it were not that the President has associated with him men of the calibre described by him to-night, we would not have that splendid order that has been exhibited at this gathering. Evidently if we are to judge from what we have seen to-night, every professor in connection with the O. A. C. in the discharge of the duty that comes to his hand in his own particular line has the faculty of impressing that splendid conduct upon those whom he comes in contact with which is being exhibited here.

My duty to-night is to introduce the gentleman who is to be the speaker of the evening, but before I do that you will pardon me if I allude to one or two thoughts that have been thrown out during the discussion this evening. I was very glad indeed to hear Mr. Henry speak as he did with reference to the residential wants of this College. I was not privileged to receive a college education, but it is not necessary that any man should receive a college education to know the benefits that must accrue from residence during college life. The consensus of opinion amongst gentlemen all over this beautiful Province of ours who have had college training, and have been in residence during that time, goes to show that possibly

they derived as much benefit from residence in College as from the lectures which they received from time to time in the various classes. The very fact of boys rubbing shoulders with each other, the very fact of boys from different localities and sections of the Province, and not only from different sections of our own Province, but different sections of Canada, and outside of Canada, in the Republic to the south of us, and also from our South African and Australasian colonies, meeting with each other and talking over conditions as they find them in their native lands—must tend to broaden them and make them better fitted for the duties of life in after years. And as far as I am concerned, I shall be glad if in any way we can help to alleviate the difficulties which appear to be in the way at the present time in reference to the matter of which I have been speaking. (Applause.) But do not forget there is something else to be said. This College is growing very very rapidly, and the thought that occurs to me is this: were we to increase the residence accommodation so that by next year we would be able to cope with your requirements, the probabilities are that, the way things are moving, within another two or three years you would require another extension, so that it is a very difficult thing to say what may come in the future in this way. But I think you are all perfectly well seized of the fact that it is the earnest desire of the Government, irrespective of the gentleman who may be the Minister of Agriculture for the time being, to aid this institution in every possible way, and I think I am safe in saying that not only is that their desire, but that has been their aim, and I think you all know that a great deal has been done in that way.

Perhaps I would say a word in reference to another feature in connection with the work of this College which I think has met with a great deal of approbation throughout the Province, and that is the means of endeavoring to disseminate the knowledge brought to the students of this College in the establishment of College representatives here and there throughout this Province. The great trouble for many years—and of course it might be expected it would be a great trouble for many years in connection with the College—was that it was new. The conditions of the Province were not so favorable as they are to-day. But now with the splendid work that the College has done, with the fact that you have amongst your students and ex-students men from every County in the Province, and the fact that the people are possibly reading agricultural journals to a greater extent than they did years ago, make it a very much easier task for those who are going amongst the people, as the district representatives do, to bring the knowledge obtained at this College home to the people, than it would have been in former years. It is very gratifying, indeed, that the movement which was launched with some degree of diffidence, which it was doubtful on the part of the Government whether it would be successful or not, is proving successful; and not only successful from the standpoint of the gentlemen who are doing that work in the various counties where these agricultural representatives are situated, but what is better still, is receiving practically the unanimous approbation of the people in these various counties to such an extent that the Government has already received applications to establish more of these stations during the coming year. (Applause.)

My good friend, the Minister of Lands and Mines, will give you a great treat, from the fact that the great bulk of the young men, and perhaps the older men, who are here to-night are not acquainted with the conditions in Northern Ontario, and before I introduce him I have just another thought to give you. Mr. Cochrane will tell us, as no doubt he is justly entitled to, and we will be glad to hear him tell, of the greatness of our mineral and forest wealth in the north country. But

we have an immense agricultural wealth in the north country, and after all, when all is said and done, if the people of this Province are only true to themselves, and true to the position in which they find themselves, there is not the slightest doubt in my mind that very many years will elapse before the Province of Ontario shall lose the proud position which she occupies to-day in this Dominion of Canada of being the banner Province of the Dominion from an agricultural standpoint. Every young man who graduates from this College, whether he goes back to his own farm, or whether he should leave the farm and drift into some other calling, should be possessed of that information which, whether he is an agriculturist himself or not, will benefit the agriculturists where his lot may be cast. I look, from the fact that your roll is increasing year by year, to a very much greater good emanating from the teaching of the President and the staff of this College in the future than even in the past.

It is my pleasant duty now to have the honor to introduce to you the gentleman who represents the interests, perhaps more than any other gentleman in the Government, of Northern Ontario; a gentleman who years ago went into that, I was going to say, unbroken forest, and by his own indomitable energy and perseverance, made good, became one of the best business men in the whole of Northern Ontario, and who knows Norther Ontario as well as any gentleman around this festive board to-night knows the city of Guelph. I am sure I am not saying too much when I say that the Hon. the Prime Minister of this Province, Sir James Whitney, has no gentleman in his counsels any higher in the estimation of the people of the Province of Ontario to-day than the gentleman whom it is now my pleasure to introduce, the Hon. Frank Cochrane.

ADDRESS.

By Hon. Frank Cochrane, Minister of Lands, Forests and Mines, Toronto.

I assure you that I hardly deserve the very flattering remarks made by my colleague, Mr. Duff, who, by the way, with Dr. Pyne, is one of the spendthrifts of the Government. I have to do the laboring in order to get the money for them to spend, so you can understand right well how it is that he is so free with his promises here to-night.

Your worthy President, when he wrote and asked me to be present here to-night, said, "It is merely an informal affair, and we only want you to speak five or six minutes." That caught me, that is the reason I am here. I don't profess to be a speaker. I was caught too late. I lived too long in the woods. He also gave me a subject to speak on, and that is, "How to Get On in the World." I do not know why he selected that for me. I know nothing about that, but I will just say two or three things as they strike me, and the first is, that you, who are attending this College, both ladies and gentlemen, are taking the first step to make progress much faster in this world than those who have not had the privilege of attending such an institution as the O. A. C. If you can attend here for two or three years, and find out all the technical points about soil and about seed and about how to do these things, and also to go on and understand about drainage, about forestry, and about other things, as I understand you are taught and study here, how much greater it is for you than for those who had to hew out their homes for themselves and take what their forefathers handed down to them in regard to agricultural processes. But when you analyse the thing, in any walk

of life, it seems to me that the best of all is what you can make it yourself. If young men would only put the same vim, the same energy, into their work of life, no matter what that work is, that they put into a game of football or lacrosse—and, mind you, I believe in these games, they are manly games, and I think that young men who enter into sports are better men for it—if you will use the same energy and determination that the boys who went to South Africa used, your walk in life will be easy, I assure you, and you will walk up the ladder much faster than in any other way. As I said before, I don't know much about this subject, but I do want to take the liberty of speaking a few words on behalf of Greater Ontario, because I do not propose, and do not pretend, to call it Northern or New Ontario. It is Greater Ontario. Would you believe it when I tell you that there are only one-fifth of the whole in the older part of the Province of Ontario, that there are still four-fifths only partially developed, and three-fifths that the surveyor has not even been over, and what the great possibilities, what the great resources of that country are it is impossible to say. As you know, a large portion of our revenue outside of what we get from the Federal Government comes from that section of our Province, and few realize how mining has jumped to the fore in the last few years, because up till last year we were the third province in the production of minerals in this fair Dominion of ours, but last year we produced 36 per cent. of the total product of the mines in the Dominion; and if you will take out coal from the production of the two sea Provinces: Nova Scotia and New Brunswick, we produced 54 per cent. of the metallic contents of this Dominion. We have up in that country the greatest nickle mines in the world. In fact, a short time ago—less than 15 years ago—we didn't produce over 10 per cent. of the total output of nickle in the world, while to-day we produce a little over 80 per cent. We have the greatest corundum mines in the world, and with Quebec we have the largest and most productive mica mines in the world also. Last year, Coleman produced nine million dollars worth of silver, or one-eighth of the total production of the world. It has produced since 1904 twenty millions of silver, and I might add that last year, if the price of silver had kept up per ounce as it had in 1907, instead of the addition being nine millions it would have been nearly twelve millions on account of the great production there. The cost of silver has been reduced by almost one-third. When you want to make comparisons, Cobalt or Coleman Township alone produced three times what the Yukon did last year, and we have heard a great deal of what the Yukon has produced. Our mining industry has not opened up as fast as I would like to see it, but, thanks to combines, thanks to probably our large production, our neighbors to the south of us are getting their iron mines cornered up so that they are coming in here and investing heavily, and I am satisfied that in the next few years our iron industry will be producing more in dollars and cents than our total mines do to-day. I have often heard the remark made by strangers when I have been going along the C.P.R. and other roads in the North, that this country is only fit for holding the balance of the world together; but when we realize that those rocks are producing something like twenty-six millions a year in this Province, it changes the aspect of things and they look much more pleasant than they would otherwise. We have to-day standing in that north country, owned by the Province and not by any citizen of Ontario, the largest quantity of red and white pine owned by any government in the known world to-day, and it is a great question of how it is best to protect and reproduce that timber. I am glad that the O.A C. is taking up that branch of it, and I think you are taking it up in a businesslike way. The late Government, and we have also followed on, started in by establishing what they called Timber Reserves. We

have established a large number also. The largest of these is Nipigon, situated this side of Port Arthur about twenty miles, or at the head of Lake Superior. It contains about 7,300 miles. It has not very much of the red and white pine, but has a great deal of spruce and jack pine. It surrounds one of the most beautiful lakes in the country. It is filled with probably the best trout fishing in the known world to-day, and is a place, even if that timber was not becoming more valuable, which ought to be handled in a different way, because in the reserves, timber will not be sold as it has heretofore by the mile, perpetual license, I might say, but only the trees that have matured and others which have to be taken out. The next largest is the Temagami, which has got one of the most beautiful lakes possible to see, having 2,200 miles of coast around it, and yet in no portion do you seem to get any farther away from the shore than you would in a river, it being filled with islands and bays. The Mississagua Reserve contains the best red and white pine that we have. We have also the Reservation established last year, and we have also the Rondeau Park, in which my good friend, Prof. E. J. Zavitz, is doing me a good turn in going up there and selecting the trees which have arrived at maturity, and we expect to receive some of the money which has been spent in preserving that Park in a very few days. We have also in the northern portion something that has not come into use to a great extent yet, but when you hear as much as you do of the Niagara Power through the Hydro-Electric Commission and one thing and another, you can readily understand what the enormous water falls in that portion of the country will mean to that country as well. It is estimated that there is at least three and a half millions horse power in that Northern Ontario. As Mr .Duff told you, there is in that country also some sixteen million acres of good agricultural land. It has been often stated that pioneering does not pay, but in this age of world-wide markets, in this age of railroading, in this age of crossing the great Atlantic in four days, I think it does, and I think if there is any man going out to hew a home for himself that Northern Ontario offers him as great inducements as it does in the West. Few of you realize that you can get on a train at Toronto and go north 500 miles nearly, and yet be no farther north than Winnipeg, that you will then be 200 miles south of Edmonton and Prince Albert. I am sure that any one of those who went on that trip north in September will tell you that he is more than surprised with what has been accomplished in such a short time. The daylight is much longer than it is here; the growth is much faster than it is here. Some of us can imagine how the pioneers of Wellington County had hardships to endure when they came here to hew out homes for themselves, and had to burn the timber which they cut in order to get rid of it, and when you realize that when you go up there and clear that land there is a market at your very door for every stick you cut of any size at all, when you realize that there is a market for everything you produce there right at your door through mining and railroading and otherwise, it shows the possibilities of our own Province. Mr. Duff says the time may come when Ontario will not be the banner Province she is. I tell you if the citizens of Ontario see their duty as I see it, and open up that vast territory up there, Ontario will always be the banner Province of this fair Dominion. We have standing to-day somewhere about eight billion feet in those reserves; we have something like four billion feet also of red and white pine on Crown Lands which is not in reservations, and if you will multiply that quantity of twelve billion feet by $10 a thousand, you will realize $120,000,000. It has been estimated, and I may say I think it a low estimate at that, that we have over 300,000,000 cord of pulp wood, and that at an estimate of

$1 a cord is $300,000,000 more. We have something like 19,000 acres under license which has been sold at different times from 1870 up to the present day. In fact I might say for the information of some who may not understand, that long before Confederation, the governments of the day did not sell by the thousand feet or by the mile, but gave a permit to cut so much. That went on for a number of years, until finally when the lumbermen went to the Government of the day and said, "We want some other system. The timber which is near the shores of the streams is now nearly all cut. We have to build roads back in from the streams. We have also to improve those streams in order to drive the lumber down to the market, and we want, not a permit for so-many thousand feet, but for so-many millions," and they issued some for twenty, some for thirty, and forty million feet, and I may say that for the famous Gillies Limit there was not one dollar received in bonus, but it was given as a permit and held from that time up to this. In 1872 the Government changed the system again, and they put up the timber by public competition by auction at so-much per million, and they sold all classes and all kinds of timber; and while the license only issued from year to year, and the Government legally could cancel the license any year, yet there would be an unfairness in doing it because of the fact that they have transferred from one to another in so many years that probably the last transfer which has taken place in the last ten years, the purchaser in buying it would pay ten or fifteen and even twenty times as much as the Crown got for it in the first place. Therefore it would be unfair to cancel those licenses without some compensation. But we have in that what will bring the Government in dues—because they pay from a dollar per thousand feet to two dollars per thousand feet when they cut it—equal to five millions more. Therefore in timber alone in that country, we have what we are satisfied is equal to $425,000,000. As I said before with regard to this great clay belt, a man going up there, a man who has got the technical training, a man who can work that soil and employ others—if he has some capital, all the better—the opportunities are so great and the markets are so good, the climate is so good, that it strikes me it is far ahead of the prairie country. I am told, though I never lived on the prairie, that the number of people who go in there is over double of those who live in the backwoods. There is another reason, and I can readily understand it, because I think there is no such company to one who is alone as the trees are. It has abundance of game and fish, and abundance of everything. I would like to say this about technical education, that I hope the time is soon coming that the money will be found, no matter where, by the Province or by the Dominion—and I am glad to say that the Dominion are discussing it and taking it up—that everybody in this Province will be able to receive a technical education no matter what his walk in life may be. Ontario has done a great deal for the agriculturist there is no doubt, and is still spending a great deal of money, but I think it is getting it back tenfold, though I don't think the time has come yet that it realizes what it is getting or that it is getting what it will in the future; because I feel that every year of this College is bringing out better results than was produced by it or by any other college ten years ago, and I feel that your spreading out and getting into every High School in this country from time to time is a great benefit not only to those who are attending there but the neighbours of those who are attending. I am satisfied that no young man can put in four years in these halls and receive the training that they do, and be able to wrap it up in their own souls, but that they must pass it on to their more unfortunate neighbours who are not able to attend here.

ADDRESS.

By Hon. Nelson Monteith, Ex-Minister of Agriculture, Stratford.

Brevity is the soul of wit, therefore I shall be brief. I appreciate, indeed it is a great honor, to have the privilege of again looking into the faces of the students and ex-students of this great institution. As it has been well said here to-night by those who have taken part in the programme, you have a great responsibility, you have high ideals to live up to, to leaven the great mass of humanity which makes up the population of this Province. You have a great responsibility. In fact, I feel that the young men—and I might here say also the young women—should feel almost inflated, as it were, with the importance of citizenship in this great Province. I am glad, indeed, that you have had the privilege to-night to listen to two members of the Cabinet who have my highest respect. The Minister of Lands and Mines is the paymaster to a great extent. He is the man who has largely to get the sinews of war to carry on the work of this institution. I am glad to have had the privilege again of attending the reunion of the students of this institution. I feel that these gentlemen should have been here to-day to fully appreciate what our annual reunion means. It means almost a sympathetic touch of the work carried on from year to year, of recent years at least, upon almost five thousand farms in this Province—work that I believe is making far better work along the lines of cultivation and seed selection and various things which go so largely to make up the large part of the agricultural productions of this Province. As I have said before, you have a great responsibility, and it is now for you to live up to that responsibility, carrying out from these halls the light which Science has borne in upon the wonders of nature. The work which you are doing here, Mr. President, with your staff is going to leaven the whole lump as years go by, and I believe that through the medium of those agricultural representatives that the result is going to be more quickly brought about. I trust that we shall be all spared to come up year after year to carry away from our annual banquet the inspiration which it always gives us in our work upon our farms; because I can speak as one of those who are farming as a business. There is no other profession in the world which brings with it the same independence, if followed with knowledge and that thoughtfulness which this institution is striving to bring to it. I trust that these gentlemen who are with us to-night will go back and tell their colleagues of the good work that is being carried on here. I think almost all the members of the Cabinet have now had an opportunity to come and view this institution and the work it is doing. They are getting a better understanding of the work it is doing, and that is what is wanted among our legislators: a knowledge of the institutions they are called upon to legislate for.

SVALOF.

By C. C. James, Deputy Minister of Agriculture, Toronto.

Six men sat about a table one evening in August last outside of a hotel in the little village of Svalof. They were representatives of five nationalities,— a German student, son of a lawyer, who was spending three or four months at Svalof studying the methods of Farmer Bondesson; a Dutch student interested in botany, study-

ing the methods of seed improvement; the Rector or Headmaster of the Agricultural High School, a graduate of the University of Upsala; Mr. R. B. Greig, the Professor of Agriculture in the University of Aberdeen; Mr. Geo. H. Clark, Canadian Seed Commissioner, Ottawa; and the writer of this paper, representing the Ontario Department of Agriculture. All were interested in agricultural matters, and, although Sweden, Germany, Holland, Great Britain, and Canada were represented, the discussion was carried on in English.

Where is Svalof? What is Svalof? How was it that five students from other countries had come to this little village? What was there to learn? These are some of the questions that I shall try to answer, in part at least, in this paper.

Where is Svalof? We had got our tickets in London at the celebrated Cook's —London to Harwich, Harwich to the Hook of Holland, thence to Rotterdam, Amsterdam, Hamburg, and Copenhagen. We had a ticket also by boat from Copenhagen to Malmo, a port in Southern Sweden. We had a fair idea that if once we reached Malmo, we could find Svalof. That was our hope, for none of us had ever found Svalof on a map of Sweden. It was not until we walked into the railroad station at Malmo that we found a map large enough to carry the name of the little village. It is situated a few miles north of Malmo on the railroad that goes through Gothenburg to Christiania, the capital of Norway. It lies about east of Copenhagen. There is a village of Svalof, but we did not discover it until the second day, as we drove about with Dr. Nilsson to see the great fields of wheat and oats. We then understood why it is not to be found on the maps, for I doubt if it has more than twenty houses. But if places are to be mapped according to their importance, there is no map of Sweden too small to carry the name of this wonderful place, this centre of production of agricultural wealth, the home of the world-renowned Nilsson. When we think of Sweden and her great citizens, such names as Linnaeus the Botanist, Scheele and Berzelius the Chemists, Ericsson the Engineer, Nobel the inventor of dynamite, Nordenskjold and Sven Hedin the explorers, and Jenny Lind the singer may occur to us. But the list would be incomplete without de Laval and Nilsson, the former who gave modern dairying a great uplift, and the latter who has shown how to double, to treble, and to quadruple the yield of grain. It is worth crossing the ocean to shake hands with a man who can grow a field of wheat over 100 acres in extent averaging over 70 bushels to the acre, and it is worth while spending a couple of days investigating how it is done. You are pleased to find that there is no secret about it, and you are surprised to find how simple is the method.

Sweden occupies the eastern part of the Scandinavian peninsula. It is about 1,000 miles long and about 250 miles across at its widest part. It lies between the 55th and 69th parallels of latitude, reaching somewhat into the Arctic circle. The southern part of it lies low, from 100 to 250 feet above the sea level. A large part of central and northern Sweden is mountainous. From these variations in latitude and altitude it will be concluded that it must have great variety of climate and soil conditions. Our investigation deals with the southern part, the district or Province of Skane, which, in many respects, resembles Denmark. Sweden is a little smaller than France or Germany, but about half as large again as the British Isles. It has a total population of 5,200,000. Skane has an area of about 2,500,000 acres with a population of 628,000. When I tell you that 60 per cent. of Skane is arable land or meadow and, though being in area only 1-400 of the entire kingdom, has about 1-8th of the entire population, you will conclude that it must be the most highly cultivated portion of the Kingdom of Sweden. Malmohus,

the Lan or district in which Svalof is situated, has 75 per cent. of its entire area cultivated, 5 per cent. in natural meadow, 13 per cent. in woods, and only 7 per cent. in waste or unproductive land.

In all the progressive countries of Europe, as well as in the United States and Ontario, there is a movement citywards. The development of manufacturing and commercialism is causing a decrease in rural population. It is so also in Sweden.

	1870.	1890.	1900.
Agriculture and Fishing.....	72%	61%	55%
Industry (manufacturing, etc.).....	15%	23%	27%

Sweden is one of the most progressive countries in Europe in regard to agricultural education and investigation. The latest returns available show a total expenditure of 6,800,000 kroner, or $1,836,000, in behalf of agriculture. This is quite liberal and should show good results. When we remember that a large portion of the agricultural area of Southern Sweden is similar to that of Southern Ontario, we might expect to find much in Sweden and her methods that would interest us. In Skane, in Southern Sweden, the peach grows out of doors as with us, apples and other fruits like our own are found there; wheat, rye, barley, oats and sugar beets are staple crops; butter and cheese are produced in factories; pigs are fed for bacon production for the English market—the one crop missing is our corn or maize, but you will find American corn being fed, for the Swedes import it to form part of their ration.

All things considered, I think the farming of Denmark and Southern Sweden is the nearest like that of Ontario of any to be found in Europe, and therefore is specially deserving of our study. It would be impossible in one address to take up all the points of interest. A choice must be made. We have heard much of Denmark and we shall hear more in the future. Sweden, however, has been overlooked. Therefore, I have thought it would be well to direct your attention as students of agriculture to what is being done in that corner of the Scandinavian peninsula lying directly opposite Denmark. You will please keep in mind that, taking the whole round of agricultural work into consideration, I do not place that of Ontario as second to either Denmark or Sweden. We have lines of work superior to theirs; we have greater diversity of productions; we have natural resources of greater extent; we have greater possibilities. The one thing, however, that impresses is the thoroughness with which they have developed the lines they are following and the systematic business-like methods that they have adopted in building up these lines of work: soil improvement, seed improvement, stock improvement, manufacture of products, transportation, marketing and co-operation. The whole people seem to be agreed upon and interested in agricultural development.

One wonders why Sweden is so little known, and why it is not more frequently visited. Tourists and investigators generally stop short at Copenhagen in Denmark. Even agricultural experts from this side of the Atlantic generally turn about at that point and go south into Germany. Therein they make a mistake. Southern Sweden can teach as much as Denmark, and, in regard to seed improvement, I doubt if there is another place in all Europe where you can learn just what can be found out at Svalof. I shall never regret accepting the suggestion of Mr. Clark to accompany him and Prof. Greig, for I set down the two days at Svalof as the most valuable lesson I ever received in information and inspiration.

What is there to be seen at Svalof? Four things. 1st—The Swedish Seed Breeding Institute, conducted under Dr. Hjalman Nilsson. 2nd—The General Swedish Seed Co., Ltd. 3rd—Per Bondesson's Farm. 4th—The Agricultural High School. The Seed Institute and the Seed Company are closely related—they are complementary—the former is the scientific organization, the latter is the commercial.

The Swedish Society for the Improvement of Seeds was organized in 1886 by a few of the farmers near Svalof for the purpose of procuring new varieties of wheat and barley. Systematic selection was the means. In 1888, Dr. Nilsson joined the staff as assistant botanist. He succeeded to the position of Director in 1891. In the five years no outstanding results had been obtained from cross fertilizing and from the usual methods of selection. In 1891, 1,000 new varieties were collected, tabulated, and the seed sown. Two hundred of these were wheat. Permanency of type was looked for. In 1892 the results, as Dr. Nilsson told us, were heterogeneous, negative. A few on careful examination were found to be homogeneous as to height, leaves, length of head, etc. All these, on looking at the records so carefully kept, were found to have been derived from one original plant. In following up this, the next year it was found that out of 422 oat plants, 397 were similar and 25 dissimilar. It was then determined by Dr. Nilsson that the most promising method was to determine new strains from individual plants. I have not time to discuss in detail the method of Nilsson as contrasted or compared with German, English, or United States methods. I would refer those interested to the lectures on Plant Breeding, by Hugo DeVries, published by Kegan Paul, Trench, Trubner & Co., of London, and The Open Court Publishing Co., of Chicago, in 1907. DeVries delivered these lectures in the United States in 1906. They give the best account of Nilsson's work that I know of, in fact the only account in the English language. Professor DeVries makes a noteworthy statement in his book:

"Under the influence of Nilsson, Burbank and others, the principle of selection has, of late, changed its meaning in practice in the same sense in which it is changing its significance in science by the adoption of the theory of an orgin of species by means of sudden mutations. The method of slow improvement of agricultural varieties by repeated selection is losing its reliability and is being supplanted by the discovery of the high practical value of the elementary species, which may be isolated by a single choice. The appreciation of this principle will, no doubt, soon change the whole aspect of agricultural plant breeding." (Preface.)

Now let us see how Dr. Nilsson works. Walking through his experimental grounds, or through the farming country of Sweden, he finds in a field a single plant of wheat which is an ideal plant, as to roots, stooling, straw, length of head, quality of seed. It is the result of cross-fertilizing in the field. It may be what some would call a "sport," or a derivative therefrom—however it got there, there it is, a superior plant. He would like to perpetuate its kind. The ordinary field of wheat is a heterogeneous mixture of types. He carefully removes that one plant and makes a complete study and record of it. He plants the seed from it and examines every plant produced therefrom. Those that do not correspond exactly with the original model plant in every detail he discards (that is unless there is a promising plant worthy of perpetuating in a new type). The others he records and preserves. Thus he continues, until finally, after five or six years, he has a large field, every plant an exact fac-simile in all particulars of the original plant. He has thus established a type. You look at a field thus produced. It stands like an army of selected soldiers, every individual plant like every other plant. It is now ready for the Commercial Company, to whom its further propagation and

distribution are entrusted. And what are the results? We saw wheat that has yielded over 70 bushels to the acre.

Again and again the Doctor was asked as to whether good results could not be got by cross-fertilization, and from the ordinary method of seed selection. "Perhaps so," he said. "We tried it, others tried it, but see my results." And when you look around and see what he has got in the past fifteen years by producing types from individual plants, we see the force of the remarks of DeVries quoted above.

Here let me interject the question, Why cannot as fine results be got in fruit production? There is something that appeals to one in Nilsson's methods: it is so simple in principle, requiring care and observation, a line of work open to the wide-awake, enterprising young farmer. One has only to see a field of standing grain at Svalof to conclude that there they have purified the varieties—there is a similarity, a regularity or definiteness about the varieties that we have not seen before. We conclude that our varieties are to a large extent mixtures of types which require annual selection to keep them up to a high state of production. It has seemed to me that we have corresponding proof of the value of this method in the animal world. Do not the St. Lambert family of Jerseys originate in Mary Anne, and the Morgan race of horses all trace back to Justin Morgan? I never before so fully realized the value of an individual. A single plant produced apparently by chance, but in reality by the fortuitous combination of good qualities, in a single natural production, if properly cared for and propagated, may mean increased national wealth that can be counted only by millions of dollars. Herein we have an argument for the training of men in agriculture, men who can see and who can foresee, and then retained for our own work, not exported. It is the duty of a nation to see that such men are trained, retained, and assisted, and fairly compensated for their work. The discoverer of a Clinton Grape, a McIntosh Red Apple, an Extra-Squarehead Wheat is a national benefactor.

Then, in addition to the method being so simple, the period of development is so short. Dr. Nilsson told us of one case where in only five years' time the product of one head of wheat had passed through the Institute, and through the Company, and was being grown in the sixth generation on the fields of the Swedish farmers. Once the type is established the necessity for annual selection is done away with. The view of those who have carefully studied it is that it will supersede the necessity of extensive work in cross-fertilizing also. Here is what DeVries says in regard to this:

"The range of variability disclosed by these new studies is simply so wide that it affords all the required material for almost all the selections desirable at present, and will, no doubt, continue to be an inexhaustible source of improvement for a long succession of years. They are founded on the principle of single selections, and the range of application of this method is proven to be so extensive as to make all ideas of repeated or continuous selection simply superfluous. It is even so rich in its productiveness that there is scarcely any room left for other methods of improvement; and especially should all endeavors of winning ameliorated varieties of cereals by means of hybridization simply be left out of consideration, as compared with the immense number of more easily produced novelties which this method offers."

This Svalof Seed Institute is unique. It has experimental grounds covering a little over 40 acres. There is a magnificent building that cost about $80,000. The Institute has an income of about $22,000, one half of which comes from the Government, one quarter from the Agricultural Societies, and the other quarter from the Seed Company and the 800 farmer members of the Institute. Dr. Nilsson is Director, and he has five trained specialists under him, one for barley, peas

and vetches; one for wheat and oats; one for clover and grasses; one for rye; and one for potatoes. All are graduates of the University. Two branch stations exist, one at Ultuna for Central Sweden, and the other at Lulea in Northern Sweden. This work is the outcome of the enterprise of the farmers themselves; they originated it, they support it by annual subscriptions, and, when a new building was needed, they donated one quarter of the cost. That is the kind of support that scientific investigation thrives on. Is there not a good lesson for Canadians in the action of the farmers of Sweden?

Next we come to the General Swedish Seed Company. This is the commercial company. It owns 1,500 acres at Svalof and leases large areas elsewhere. Its capital is 800,000 kroner ($216,000). The seed grain is taken from the Institute and increased by sowing. After two years, it is offered for sale. Every bag is examined by the experts of the Institute and nothing is allowed to be sold unless it has the seal of the Institute upon it. Practically all the seed grown in Southern Sweden comes from the Company.

Dr. Nilsson drove us over the big farm, when we saw one field of wheat over 100 acres in extent, Extra Squarehead No. 2, that promised a yield of 70 bushels to the acre and all the product of one original plant. Professor Greig took off his hat and paid his compliments to Swedish agriculture. The Doctor told us that in 1906 a 75-hectare field of wheat yielded 6,300 kilogrammes per hectare by actual measurement. I did some figuring in my note book. A kilogramme is 2.2 lbs.; a hectare is 2.47 acres. Allowing 60 lbs. to the bushel, you will see that means over 94* bushels to the acre. We drove on, in silence for a time, to see a field of oats.

What has been the result? Most of the grain grown in Southern Sweden is from seed produced by the Institute and handled by the Company. Since the work was begun in 1886, the average yields of wheat, rye, oats and barley on the best farms have increased over twofold. The land is nearly all owned by the farmers. There are few tenants. Land adjacent to Svalof is worth 2,000 kroner per hectare, or about $225 an acre.

AVERAGE CROPS, 1886-1895.

	Bushels per Acre.			
	Wheat.	Rye.	Barley.	Oats.
Entire Kingdom.....	22.23	21.54	22.06	19.80
Malmohus	26.6	26.7	27.24	24.37

Thus we see that in the district in which Svalof is situated the average of four grain crops fifteen to twenty years ago was four to five bushels per acre above the average of the entire Kingdom. These are the latest figures available to the writer at the present time. Please keep in mind that we are referring to an area in Southern Sweden which forms but a small fraction of the entire Kingdom. There are large areas where the natural conditions are not at all favorable to intensive agriculture, where primitive methods still prevail. The work of Svalof, however, is extending in influence and no doubt the next decade will see a great increase in the output of agricultural produce.

* This large yield has attracted some attention, and has never been questioned. The published records for 1906 are not at present available. The experimental yields of Extra Squarehead wheat for 1908 will be found in the appendix to this paper.

One word more before I take you to Bondesson's Farm. The Institute has a large building, well equipped, with accommodation for investigators. You could go there to-morrow and take up the study of plants; a desk would be given you. You would have free access to the museum and records. You would be welcome, there would be no charge, except that you would have to pay your board at the hotel which stands opposite the station. If Maja Johansen is still there she will take good care of you. Even if you cannot speak Swedish, you might be as able to get as good meals and have as enjoyable a time learning Swedish words as did our English party—but that is another story.

The Bondesson Farm. Dr. Nilsson told us that his neighbor farmer, Bondesson, had a good farm. As we strolled about in the evening, we discovered it, and our friend the German student volunteered to introduce us and show us over the farm, for he was there studying Swedish methods of farming. He had spent some months similarly studying agricultural methods in France, Holland and England. He was fitting himself for farming in his native province of Oldenburg. He had a good command of English and I think he profited some from spending a day with us improving his acquaintance with the language. His chief concern at Svalof was in studying the "elevation" of cattle, horses and swine.

Mr. Bondesson is a farmer applying to his 375-acre farm the results that are being worked out by Dr. Nilsson. He is a member of the Lower House or Camera of the Swedish Parliament. He had us register in his visitors' book, then he showed us his agricultural prizes, 188 gold and silver medals, besides numerous other trophies, for he has the prize cattle of Sweden and his farm may be said to be the model farm of Southern Sweden. Then he unlocked a drawer and showed us his decoration, for the King of Sweden has conferred upon him a royal honor in recognition of his agricultural service. He is a Knight of the Order of Vasa. Did you ever hear of a Canadian farmer being knighted?

The property has increased in value, and the operations extended. Some years ago a joint stock company was organized consisting of the father, the five sons, three daughters, and the two sons-in-law. On the farm is a creamery and a cheese factory. There are also belonging to the Company one other creamery and four other cheese factories. The buildings belonging to the Company are insured for $180,000. Here we saw the dairymaids at work making butter and cheese. We saw the piggeries with 2,114 pigs, mostly English Yorkshire, being fed to be made into bacon for the English market. The feeding was being carried out on well-balanced rations, the details being all tabulated so that visitors could see just what was being done. We saw the young calves in isolation under the Bang system, we saw the fields of sugar beets grown for the sugar factory, and the fields of Grenadier and Extra Squarehead wheat. We saw the celebrated stallion Picador, son of the English thoroughbred Isinglass, kept here for the improvement of the stock of the country. We saw the herd of Holland-Friesian cows tethered in a field eating their way through a crop of oats, peas and vetches. I have here a full record of this farm. I shall have to reserve the details for another paper. The herd consists of 50 cows, Holland-Friesian breeding. The highest yearly average was in 1904-5, when it reached 10,406 lbs.;* last year it was 9,460 lbs. The average for the past six years was 9,937 lbs. The milk averaged 3.17 of butter fat during the past three years. The annual wage bill of the farm, 40,000 kroner ($10,800).

* These are Swedish pounds, add ten per cent. to bring to English pounds.

The week before we were at Svalof, sixty members of the French House of Representatives had come to Svalof to see Dr. Nilsson's work and Per Bondesson's farm. It would pay Canada or the Province of Ontario to send a big delegation just to show how material development can be produced by the application of scientific methods.

But we are not through with Svalof. Our German friend was there studying the methods of raising stock at Bondesson's farm, and our Holland friend was studying plant production under Dr. Nilsson. What about the Swedish Rector, the schoolmaster? As we came down the double line of black and white cows in the pasture field, we reached the road and started for home to test our powers of gesticulation to get another meal. As we walked along the road a large red brick building caught our eye. It stood back from the road, one of a group of four, with lawn and trees in front. Over the door was the word Fridhem,—"House of Peace," said our German guide, "That is a school-house." Dinner could wait; a fine school-house standing by itself out in the country aroused our curiosity. Could we see through it? Our friend went inside, and in a few minutes came out with the Swedish rector. We had found unexpectedly a Rural or Agricultural High School. Introductions followed, and we were shown through. The headmaster apologized for his English; at first it was hesitating, but inside of an hour he was talking quite freely. How superior in the matter of language these European people are to us Canadians: German, Hollander, Swede, all able to speak and read English. The plant consisted of a central red brick building fully equipped for teaching, a large gymnasium, a dormitory, with dining-room for forty students, and a building for tools and outdoor equipment all standing right out in the country. Two acres of garden and orchard were attached to the school. It was by mere chance that we happened along that road on our way home, but our visit to Svalof would have been incomplete without our having seen this rural high school. Gradually our conceit had been oozing out, we were coming into a decided state of humility. This rural school seemed to be a natural complement of the other three features of Svalof.

This school, it should be stated, is not the only teaching institution of the place, for we saw, close to the little village, a fine new public school building that would be a credit to any rural public school section of Ontario. The high school provides two courses. There is a winter term for young men from November 1st to April 15th, consisting of a regular high school branch and an agricultural course; and a summer term for young women from May 1st to July 15th, consisting of a high school course and a household training course. Students admitted to the winter course must be 18 years of age. After completing the theoretical course in agriculture, students to the number of 24 may continue their work in practical agriculture at a farm nearby which is under the direction of an expert farmer. State aid is given to deserving students, and there are two travelling fellowships of 100 kroner each The charges for board and tuition are very light, amounting to about $60.

Girls are admitted from 16 to 20 years of age. The cost of their course is about $45. This school was started in 1895. There are other agricultural high schools in Sweden, the oldest of which was established at Ultuna, in Central Sweden, in 1848. The teaching of agriculture has received attention for many years. As far back as 1740 a chair was established at the University of Upsala for the investigation and teaching of "Rural Affairs and Agriculture." In 1811 the Academy of Agriculture was organized. In 1833 an institute for the teaching of agriculture was established on an estate near Lake Venern. Following this, agricultural schools were established in all parts of the kingdom for the practical training of young men. Following a Royal Commission in 1884, what are called Farmers' Schools have been

established, which are usually attached to the People's High Schools, and which give, during the winter months, an elementary instruction in theoretical agriculture. Thus there are three forms of agricultural training, viz.:—

1. The Agricultural Schools (practical).
2. The Farmers' Schools (theoretical).
3. The Agricultural High Schools (similar to that at Svalof).

All these are under the direction of the Royal Board of Agriculture. In addition there are Farriery Schools and Dairy Schools in various provinces. There is no Agricultural College of the scope or having the equipment of the Ontario Agricultural College. It will be seen that the plan worked out in Sweden has been to provide for agricultural instruction at a large number of centres; thus the farmers' sons in Sweden can get instruction in the theory and practice of agriculture without going far from home and at a small expenditure.

Sweden is a large country; she has magnificent resources in her forests, her mines and her water powers. In her soil and climate she is not nearly so fortunate as Ontario, but she has shown great wisdom in the development of her agriculture. Her people are thrifty, intelligent and persevering. They are an attractive people, a most desirable class for colonization. They are well worth studying. They would make most valuable settlers for the new lands of Northern Ontario. From their success in the Northern United States I had expected to find a progressive people in Southern Sweden, but I am free to confess that I had not anticipated such things as we saw at Svalof. One thing in particular impressed me, namely, the initiative, the self-reliance of the farmers. They did not wait for the leading and the paternalism of the Government. They themselves initiated movements to which the Government afterwards gave assistance. There is energy and enterprise in the people themselves—they do things. There is promise in such a people, there is a lesson for the farmers of Ontario in this regard.

I have tried to tell you something of this most successful Seed Institute, which originated with the farmers; of the Seed Company, which is owned and controlled by the farmers; of the model farmer who has grown rich, and who remains a farmer conducting a business of immense proportions; and of the Agricultural High School, where the farmers' sons and daughters can receive a higher education for farm life. You will now perhaps understand me when I say that the two days spent last August at Svalof were days of instruction and inspiration. I can only wish that you also may from this limited statement get some instruction and, what is better, some inspiration.

The Chairman then called on Mr. G. H. Clark, Seed Commissioner, Ottawa,, who had visited Svalof the past summer with Mr. James.

Mr. G. H. Clark: It was an excellent idea to place a representative in agriculture in the various counties It is well that the work of these representatives should not develop too fast, but I am hopeful that within ten years the farmers will have had so much of them that they will demand in all the various counties of Ontario an Agricultural High School equivalent in equipment and staff to the Agricultural High School that we saw at Svalof. I am sure that we can have these Agricultural High Schools when the farmers will appreciate the training that their sons will receive, and we will be closely approaching the time when our people will be raising crops in Ontario equal or almost equal to the best we saw in the lowlands of Scotland and in Southern Sweden.

The farmers of Sweden, with their keen intellect, have learned to apply fertilizers to their advantage. They can discuss with you very intelligently and give you accurately what quantity of fertilizer it will pay us to use on the land for their

vegetable crops and root crops, and in some cases for the grain crops. If they can use $10 worth of fertilizer and get $12 worth of crop back, they will use it, not only in Sweden, but in Denmark, Switzerland, and France. I saw commercial fertilizer used to an extent that would amaze our people. It is not for me to recommend the use of fertilizers; the farmer will have to determine for himself to what extent it will pay him to use commercial fertilizers. It is largely owing to a wise use of fertilizers that the people of Europe are able to grow such enormous crops and you can depend upon it, they could not pay the rents if they were not getting yields any greater than we have seen in Ontario.

The system of growing seed in Sweden has now become the system that is adopted throughout Germany, Switzerland, and France. We have in Europe, as well as in America, a great many scientific men who are doing work like Prof. Nilsson, and they have to show something for the money which has been contributed. When I spoke to him about cross-fertilization he illustrated it in this way: "I would do more if I were a rich man; but when we have to consider what we have in our fields and what we have already had prepared for us, we try to improve our crops by individual plants. The selection of individual plants, compared with cross-fertilization is as if I wanted to go to Berlin and I would go to New York first and then back to Berlin, instead of going directly to Berlin." The crops we saw in southern Sweden were ample evidence of the effectiveness of his plan.

Experiments on Extra Squarehead II. in 1908.

(From the printed records of the Swedish Seed Co., 1909, pp. 12, 13.)

This new seed, which in all probability will be offered on the market as early as next harvest, has, during the year of 1908, been tested by special experiments in conjunction with common Extra Squarehead on a number of farms in our southern provinces, particularly Skane, which province is especially adapted for such experiments.

We are here giving a short summary of the results obtained from all experiments during 1908, in so far as the returns have been made, showing the yields of grain in bushels per acre.

	Common Extra Squarehead.	Extra Squarehead No. 11.
Malmohus County—		
Bunketofta Morarp	51.6	61.0
Ronnetorf Svalof	41 0	47.0
Utsadesforeningen Svalof	59.2	65.8
Remmarlofs Farm, Eslof	44.9	46.8
Nobbelofs Farm, Lund	58.7	67 0
Alnarf	51.5	61.2
Jordbergal	61.6	70.4
Wemmenhogs Farm, Tofthog	45 3	48.4
Kristianstads County—		
Skottlandshus, Farfof	54.3	67.5
Kalma County—		
Skalby Farm, Kalma	58.5	57.5
Svartingstorp, Lackeby	40.9	25.8
Average of all Experiments in 1908	51.9	56.2
Average in Skane in 1908	52.4	59.4

All the experiments conducted in Skane show that Extra Squarehead II. yields 13 per cent. more than the common. In Kalmar County the Common Extra Squarehead is superior to No. II. The average yield of Extra Squarehead No. II. shows 8 per cent. above the common in all experiments made. At the time of writing, returns from the County of Halland have not yet come to hand.

Extra Squarehead No. II. has been tried at Svalof and Alnarp for three years (1906-1908), during which period the average yield has been respectively 17 and 18 per cent. higher than common Extra Squarehead. On very large areas at Svalof the new seed yielded 3,550 kg. per hectare during 1908; common Extra Squarehead yielded under the same conditions 3,150 kg.—a difference of 13 per cent.

Comparisons between common Extra Squarehead and Extra Squarehead No. II. in the Province of Skane all point in the same direction in nearly every case. From the results now obtained it is reasonable to expect that Extra Squarehead No. II will yield several bushels more per acre than the common, a difference which must be considered of the greatest value. It may be added that the new seed is somewhat heavier and shorter in the straw than the common, which it, however, resembles very much.

(Sgd.) H. Nilsson-Ehle.

FROM OFFICIAL SWEDISH STATISTICS.

Crops in Sweden in 1907.

	Acres.	Yield Bushels.
Wheat, winter	201,426	5,750,672
" spring	15,376	334,380
Barley	486,780	12,415,424
Oats	2,001,945	62,600,376
Rye, winter	983,431	20,929,488
" spring	22,047	391,552
Mixed grain	374,803	13,044,544
Beans	11,241	164,584
Peas	48,135	797,976
Total	4,145,184	116,428,896

Live Stock in Sweden.

	1890.	1900.	1907.
Cows	1,578,927	1,764,819	1,804,473
Other cattle	820,564	817,736	824,509
Sheep	1,350,804	1,261,493	1,021,727
Goats	86,980	79,826	65,798
Swine	644,861	805,805	878,828
Horses	487,429	533,050	566,227
Reindeer	296,220	231,960	235,600
Poultry	1,414,016	2,310,001	3,691,439

PER BONDESSON'S FARM, SVALOF, SWEDEN.

(Translated by Mr. J. F. Hansen.)

I.—General.

Per Bondesson's Farm Company, of Svalof, Sweden, was registered in the year 1898, with the object of purchasing and carrying on the farm dairy and cheese manufactory belonging to Mr. Per Bondesson, member of the Swedish Legislature, and acquired by the latter 22 years previously. The capital of the Company amounts to 320,000 kroner, and the shares are held by members of Mr. Bondesson's family. The registered office is at Svalof.

The Directors of the Company are:—

Chairman and Managing Director Mr. Per Bondesson, Knight of the Order of Vasa.

Bonde Bondesson, Civil Engineer, Ostra Carlnas, nr. Svalof.

T. Akesson, Treasurer, Wallenborg near Svalof.

The Company own the land known as No. 8 and No. 3 in the Parish of Svalof, and No. 5 in the Parish of Felestad.

The property is assessed for taxation at 180,000 kroner, and consists of 150 ha.* of arable land, clay soil, with clay subsoil, which is drained and in good cultivatable condition. The buildings are insured for 673,640 kroner. The Dairy and Cheese Manufactory was started in 1876. Originally these were carried on in a small way, but increased from year to year till 1890. Since that year no extension has taken place.

The Creamery at Kagerod, also belonging to the Company, has been carried on since 1886. Cheese factories were added in 1890 at Grylevad per Astorp, at Strofvelstorp per Hasslarp, at Walo per Wallakra, and Horby per Horby. The turnover for the year 1907 was as follows:—

Number of Milk Sellers, about	400
Fresh Milk received	7,834,691 kg.
Skimmed Milk supplied to Cheese Factory	6,935,000 kg.
Butter manufactured	228,396 kg.
Cheese manufactured (milk cheese) at Svalof	365,390 kg.
Cheese made at branches (Margarine Cheese)	603,171 kg.

The grades of cheese manufactured are 1-1, 1-3, 3-4, 1-2, 1-4 (cream cheese) skimmed milk cheese and margarine cheese.

In conjunction with the dairy, extensive raising of hogs is carried on, consisting partly of raising breeding stock, viz., "large white English" (Yorkshire), and partly of generally raising and fattening for sale to packing houses. Of the latter type, there have been raised per annum, on an average, at the following depots:—

At Svalof, about 3,000. At Wallakra, 600. At Astorp, 350.

The total stock of hogs amounts at present to:—

At Svalof, Breeding Stock	100
Ordinary Stock	1,400
At Wallakra, Ordinary Stock	350
At Astorp, Ordinary Stock	175

The Cheese Factory at Horby supplies whey to the Milk Sugar Factory at that place. The farm sells a large quantity of breeding animals, viz., cattle of the East Friesian and hogs of the Yorkshire type. This breeding stock is exported to all parts of Sweden, Denmark, Norway, Finland, Germany and Austria.

The Company has received, since 1881, about 150 medals and diplomas at various exhibitions; 125 of these have been obtained since 1891.

1 ha. (hectare) = 2½ acres; 1 kg. (kilogram) = 2.20 lbs.; 1 kroner = 26 to 27 cents.

II.—Raising of Cereals.

The acreage has been divided into eight units, consisting of 18 ha. each. These units are being cultivated in the following rotation:—

1. Wheat.
2. Turnips and potatoes.
3. Barley.
4. Green feed.
5. Wheat.
6. Oats.
7. Clover and grass.
8. Clover and grass.

Note.—The following information is given as to seeding:—

1. *Wheat.*

Of wheat, partly the "Grenadier" variety and partly the "Extra Squarehead" is being raised. The seeding quantity amounts to 180-200 kg. per ha. The soil receives 20 loads of stable manure and 200 kg. of 20 per cent. biphosphate per ha. In the spring the field is being harrowed and rolled, and, if necessary, Chile saltpetre is afterwards applied.

2. *Turnips and potatoes.*

As a rule 10 ha. are planted with sugar beets and 7 ha. with turnips, and the balance with potatoes. The acreage, so far as it is covered with stubbles, is being ploughed when opportunity is given with a breaking plough, and manured with 15-20 loads of stable manure per ha. In the spring 150-175 kg. of 20 per cent. biphosphate, 100 kg. of 37 per cent. potash, and, shortly before the planting of the beets, 50 kg. of Chile saltpetre is applied. Afterwards further quantities of 50 kg. Chile saltpetre are twice applied.

Of turnips, only the following varieties are being raised:—

Des Barres, Eckendorfer and Light Red Sugar Beets; for these varieties the soil need not be so well manured. During the last few years pease have been sown on 2-3 ha. where formerly beets were placed, as a difficulty is being experienced in obtaining hands for the best cultivation.

3. *Barley.*

The "Prinzess" variety is being used. This variety does not require any manure. The quantity seeded is 150 kg. per ha. In the fall and after the harvest the soil is half-manured in preparation for the following year.

4. *Green Feed.*

As a rule an early maturing variety of peas is sown on part of the land; the remainder receives ordinary green feed, which serves for cattle grazing. The mixture consists of two-thirds peas and vetches and one-third oats. The quantity sown amounts to 250 to 280 kg. per ha. The seeding is performed at three different times, which creates the advantage of letting the cattle graze off it successively. After the grazing the land is ploughed at a depth of 20 to 25 cms., and manured with 200 kg. of 20 per cent. biphosphate.

5. *Wheat.*

Qualities of wheat applied here are the same as under No. 1, the amount seeded being 180-200 kg. per ha.

6. *Oats.*

The soil is manured in the spring with 125-150 kg. of 20 per cent. biphosphate. This manuring benefits not only the oats, but also the clover and grass during the year following. The quantity of oats sown is 150-160 kg. per ha.

7. *Grass and Clover.*

The acreage is now kept in grass for two years, and the following mixture of seed is used:—

Silesian and Swedish Red Clover 8 kg., Alfalfa 3 kg., Alsike Clover 2 kg., White Clover 0.5 kg.

Cocks-foot grass	3	kg.	per ha.
Meadow grass	12.5	"	"
Timothy grass	2	"	"
French Ray grass	4	"	"
Cockle grass	1	"	"
English Ray grass	2	"	"

Grazing is not commenced until after the hay has been saved, viz., in August and September.

8. *Grass and Clover* (second year).

Fourteen days after the hay crop has been got in the young cattle are, in the second year, turned out to graze, and afterwards the land is manured and prepared for wheat. The land is being worked with appliances according to requirements. In the spring a light harrow is generally applied, after which the drill is used. All seeding is done by Melichar seeding machines. In the fall the stubbles are broken in depths of 20-25 cm. The fields containing either wheat or grass seed are rolled in the spring, and, when necessary, the wheat fields are also harrowed over again If possible, all cutting is done by mowers and self-binders. The grass is cut with grass mowers, and hay is turned by hay-making machinery.

III.—Horses.

The 16 horses which are working on the farm are partly thoroughbred Ardenne and Clydesdale, partly half-blood. There are also several mares, of which one is a thoroughbred English, and a few English half-blood; also a thoroughbred English stallion, "Picador." The latter is descended from the world-famous stallion "Isinglass," which won at various races, during two years, 1,442,700 kroner. "Picador" holds a record of being the second English racer, namely:—

1,609 metres in 101 seconds. At the Horse Show at Malmo, in 1906, he received a special diploma from the "Swedish Feltridt Club." This stallion's covering fee is 25 kroner. The number of mares put to this stallion has increased from year to year, and amounted, in 1907, to 66.

IV.—Cattle.

Eight years ago the whole of the stock of cattle consisted of Shorthorn, but since then it has been entirely replaced. All Shorthorns were sold, and the whole of the present stock consists of East Friesian cattle. The first 13 cows of this breed were purchased in the spring of 1900 by auction from Farmer C. Mage, of Borreby: subsequently two consignments were imported direct from West Friesland. There are now 4 older and 12 younger bulls, 52 cows, 18 two-year-old and 15 one-year-old heifers, and 18 calves. It is considered that the stock of the farm is one of the best in either Friesland or Sweden. The older animals above referred to are all descendants from the old "Gallus" (77). The imported animals are selected and of good pedigree, have a good appearance and excellent milk-yielding qualities. They have been only once to an exhibition, which was at Norrkoping, in 1906, when five cows and a bull, "Baron" (1305) received a first prize. The judgment of the committee read as follows:—

"Special fine, robust and pure collection—a collection of five heifers and one bull "Onno" (1831)—were exhibited on this occasion and received the second prize."

The committee stated these excellent imported heifers had not received the prize owing to the absence of evidence as to the original pedigree and full details. The bull "Baron" was again exhibited in the spring of 1907, with 22 descendants, and received first prize.

In addition to the stock mentioned above a bull named "Allan," aged 6 years, has been acquired for the price of 4,000 kroner. In addition there is a young bull named "Mazeppa," (4) which received a first prize. The sale of breeding animals takes place three times a year at auction sales at Malmo, and partly privately. Altogether some 30 bulls have been sold at fairly high prices so far. The highest price obtained up to the present time is 3,010 kroner for the young bull "Baron dal," descended from Baron (1305) also from "Dalia" (3747) which was acquired by the Association of Breeders at Dagstorp. The mother of this bull had, during 6 years, an average yield of milk amounting to 5,955 kg., with 3.2 per cent. of fat.

During the summer of 1907 a new stable was built for the young cattle which did not react to the tuberculin test. It is intended to raise gradually a complete stock of cattle which have not reacted to the test.

The artificial food for the cows is composed of 30 per cent. of bran and 70 per cent. of oil-seed cakes: the quantity of cake and bran fodder given is calculated upon the milk result of the cows, viz.: for a cow yielding 6 kg. of milk 1 kg. of fodder, for a yield of from 6 to 12 kg. milk 2 kg., for a yield of from 12 to 18 kg. 3 kg. of fodder, from 18 to 24 kg. 4 kg. fodder, and for larger yields 5 kg. Hay is given in quantities of 2 to 4 kg., and straw according to requirements. In the fall and during the winter turnips are supplied so long as there is any stock left, and later slices of turnips are given. The calves receive milk during the first five or six months and also linseed cake, crushed oats, turnips cut up, hay, etc. Older and growing bulls are given exercise, if possible, once daily, and cows once weekly. The result of the milk yield during the last few years can be observed from the figures given below.

ANNUAL RESULTS.

Year.	Total Fodder Units.	Kilograms Milk	Kilograms Butter-Fat.	Fat Percentage.	Kilograms Butter.	100 Fodder Units produced.			Price Received.		Number of Cows.
						Kilograms Milk.	Kilograms Butter.	Value.	For kg. Milk.	For kg. Butter.	
								kr.	kr.	kr.	
1900–01.....	2,406	3,191	94.98	2.99	104.60	132.7	4.36	.....	6.76	1.91	5.0
1901–02.....	2,511	3,746	110.80	2.96	121.60	149.2	4.82	.....	.....	....	8.2
1902–03.....	2,607	4,578	134.50	3.08	148 00	167.3	5.08	....	.....	.....	12.13
1903–04.....	2,673	4,363	142.49	3.11	156.95	171.3	5.87	11.48	5.3	1.39	18.50
1904–05.....	2,925	4,730	144.50	3.05	158.46	161.7	5.42	10.56	6.2	1.71	21.06
1905–06.....	2,855	4,468	141.35	3.16	155.47	156.5	5.45	11 19	6.6	1.75	40,13
1906–07.....	2,791	4,613	147.27	3.19	162.39	165.3	5.82	12 41	5.9	1.55	50.6
1907–08.....	2,692	4,300	135.81	3.16	149.64	159.7	5.56	11.72	5.6	1.52	52.2

V. Hogs.

The raising of hogs has been carried on since about 30 years ago, when it first became necessary to increase the quantity of hogs raised, owing to the increase in the dairy business, and the necessity of turning the by-products from the manufacture of cheese and butter into use.

The hogs raised originally were of a common local breed and the bacon was not of a good quality. Later, when the dairy business increased, it became necessary to acquire a quick-growing variety of hog which, at the same time, gave better yield in weight. Trials were made with various breeds, for instance Berkshire, Tamworth, Poland China, Yorkshire and others. It became clear from the first that the Yorkshire variety was better than any of the others. In 1883 a boar was purchased, which had been imported by the Alnarp Agricultural Society. Later a purchase of boars and sows was made direct from England, the home of this breed, and at present the whole of the breeding stock in hogs consists of pure Yorkshires, or the large white English variety. The breeding stock consists now of 4 older and 7 younger boars, also 25 growing ones, 48 older and 19 younger sows, altogether about 100. In addition to this breeding stock there is a stock of hogs amounting to 1,400. The hogs raised for sale are recruited from such animals as do not prove suitable for breeding purposes, and the remainder are purchased from small farmers in the district. In order to keep a pure stock it has been decided to keep all breeding boars and mother cows with the farmers who sell milk to the Company. The sows are given out on the condition that the Company can always obtain the sucking pigs at the current day's price. The latter, up to a weight of 15 kg., are sold at a fixed rate: for all others the current weekly prices are paid.

The principle has been laid down to breed, so far as possible, a variety which is suited for the climate, and also quick-growing, and which develops an abundant quantity of bacon, and this breeds numerously and yields an ample quantity of milk for the sucking pigs.

The Svalof breeding stock, which has occupied the front rank in Sweden during the last 20 years, has been able to maintain this position. This is proved by the numerous prizes and diplomas conferred upon this stock since 1891. The following prizes have been awarded:

At Gothenberg, 1891, 14 prizes in respect of 14 exhibits.
In Ystad, 1893, 9 prizes for 9 exhibits.
In Malmo, 1896, 16 prizes for 23 exhibits.
In Kristianstad, 1899, 12 prizes for 12 exhibits.
In Gefle, 1901, 11 prizes for 12 exhibits.
Helsenberg, 1903, 10 prizes for 16 exhibits.
Norrkoping, 1906, 18 prizes for 18 exhibits.

And besides various diplomas, a gold medal at Gothenberg in 1891, and Norrkoping in 1906. Further hogs which were bought at Svalof received 12 prizes, of which the two first ones were conferred on the older breeding boars and two upon the older sows at an exhibition at Odensee, Denmark.

The fodder for the mother sows is composed of two-thirds of mixed grain crushed, and one-third of bran. Quantity 325 kg. during the sucking time and one to two kg. previously. In the summer and fall they are given also alfalfa, in the winter and spring turnips. In drinking they receive clear water. Older and also growing boars receive fodder consisting of mixed grain crushed, and crushed oats. They also receive some wheat refuse and some green feed.

The young sows which are intended for breeding purposes are raised on the same fodder as the older ones, with the difference that crushed barley is substituted occasionally for bran. At the time the pigs are turned out on the stubbles they receive less cake and bran fodder and sometimes only dairy refuse. The feeding of the sows when quite young is of great importance, and the following is the procedure:

Feeding is generally commenced when 14 days old. For the first week they receive whole wheat or barley, fresh water, and in a separate trough. Later they receive, for several weeks, some fresh milk and gradually one proceeds to feeding them with skimmed milk or butter milk, and in 6 or 7 weeks they are taken away from the sow and can go on by themselves. Whole wheat is gradually ceased and mixed grain or crushed barley given. It is of importance that only fresh fodder is given to them, sour milk or old or moulded grain must be avoided. In order to keep a strong frame lime-containing substances, such as shells, bone meal, charcoal, etc., are supplied. In order to keep exact control a careful register has been kept since 1891, and the various animals are given numbers. For instance, when the pigs are 10-20 days old they are marked, and a special book is kept. In this book is also kept an account of the various sows, so that the result yielded from each of them can be seen. Later the young sows which are intended for breeding are marked with an aluminum button on their ears, which on the reverse contains the number in the book. The breeding boars are numbered and a special register is kept respecting them. When sold, the purchaser has an extract from the Stock Register giving the date of birth and the mark, name and number of the parent.

It has been arranged for the favorable thriving of these animals that during good weather they are turned into the enclosure adjoining the sties.

The feeding of the hogs for sale is based principally upon dairy refuse. The selection of artificial fodder, such as seed-cake, is to a large extent based upon the varying prices of these commodities. The price of hogs also must be taken into consideration, but as a basis for the composition of artificial foods, the following can be accepted:

In the morning one-half crushed mixed grain is used and half flour, etc. In the afternoon a mixture is given consisting of maize, or maize meal, barley-bran and mill refuse, also a little warm water and whey. This mixture, prior to being used, is placed out for 30 hours for cooling and fermenting. The fodder is at both times given separately, and the milk is not admitted until after the food has been eaten. The quantity of fodder given amounts to about 1 kg. to each hog, and in this way a smaller one receives a half kg. and the larger ones 2-2½ kg. As the hogs develop the quantity of food given increases and gradually the younger animals receive the skimmed milk, while the older ones receive the whey.

Any young pigs purchased from outside are carefully watched during the first period, in order to avoid their receiving too much liquid, which may have unsatisfactory consequences. In order to keep their frames in good condition they are given bone-meal, shells, charcoal and gravel until they have a weight of 60 kg. They are turned out every day into the enclosures. Last year some 2,700 hogs were sold and the prices were calculated according to the weight on delivery. Most of the hogs are now sold to the export packing house at Landskrona. There are eight men in charge of the Company's pig-sties.

Crushing of the seed-cake, etc., is done with the assistance of the dairy steam power. A large number of breeding pigs are sold, not only to this country, but also to Denmark, Finland, Germany and Austria. The farm can always supply breeding pigs and will be pleased to supply price lists and further particulars on application.

VI. The Dairy.

The Dairy consists of the butter and cheese department and is carried on partly in Svalof and partly at the branches at Wallakra, Horby, Astorp, Stafrelstorp, and Kagerod.

The number of milk sellers amounts to 400 and the amount of milk weighed in at Svalof amounted in 1907 to 7,834,691 kg., of which 228,396 kg. of butter were manufactured. Approximately half of this butter was sent to England by the Swedish Butter Export Association, the balance was partly sold back to the milk sellers and to co-operative societies at Billeshalm, Hàganàs, Ekeby, Furnlund, etc.

During the last year 4,358,000 kg. of fresh milk were used for cheese manufacture.

The following grades are being made here: 1/1, 3/4, 1/2, 1/4, cream cheese and skimmed milk cheese.

Only margarine is made at the branches, and the skimmed milk for this purpose is bought at another dairy in the district where these branches are situated

At Kagerod the Company has also a creamery.

The daily quantity of milk received in Svalof amounts sometimes to as much as 30,000 kg., and cheese is made at the various depots from some 20,000 kg. milk per day. The sale of cheese is conducted partly from Svalof and partly at the branch depot at Stockholm, the Company's cheese being purchased in all parts of this country.

The dairy of Svalof is quite up-to-date, considerable improvements having taken place, all the machinery is of the newest and best construction, and in connection with the making of butter, ice and cooling machines are being used.

The premises are lighted by acetylene gas.

In the various dairies the Farm employs 5 male and 5 female dairy assistants and 3 junior assistants, 4 mechanics and 20 apprentices; altogether 37 people. The whole of the stuff are insured against accidents. The Farm produces in all the following quantities of provisions per day, being a quantity sufficient to supply a city of 20,000 to 25,000 inhabitants:

7,000 kg. butter.
1,000 kg. milk cheese.
1,700 kg. Margarine cheese.
800 kg. Bacon.

THE HIGH SCHOOL AND AGRICULTURAL SCHOOL, FRIDHAM. SVALOF, SWEDEN.

The High School and Agricultural College at Svalof is situated near the railroad station of the West Cost Railway in the parish of Svalof, Province of Malmo

The buildings of this institution are valued at 70,000 kroner. The oldest were erected in 1895, the remainder during the years 1899, 1901 and 1907. They include two large and well ventilated lecture halls, with library and cloakrooms. There is also a large gymnasium with modern equipment. In a separate building are the living apartments of the students, masters' and matron's apartments, dining rooms, and in all 20 light and well fitted up bedrooms with accommodation for two students in each room.

All arrangements in connection with the institution are in accordance with modern requirements, and it may be regarded as one of the best in the country.

The programme of the school includes:

1. A winter term for young men from 1st November to 15th April, consisting of a High School Branch and an Agricultural College Branch.

2. A summer term for young women from the 1st May to 21st July, consisting of a High School and household training branch.

High School Department.

The object of this department is to give young men practical general instruction to fit them for any duties in civil life. The instruction consists of lessons in Grammar, History, Geography, Local Government, Constitutional Instruction, Chemistry, Physical and Natural History, Arithmetic, Writing, Book-keeping, Surveying, Weighing, Riding, and daily practice in Gymnasiums. There is no entrance examination necessary in this Branch, but it is a condition that students be not less than 18 years old, as a student would otherwise fail to profit by the instruction given, and a student under that age would not be eligible for receipt of State support. (See below.)

Agricultural Department.

The object of this Department is to impart general agricultural knowledge and principally to give the students a theoretical instruction in agriculture.

Secondary instruction is given in Grammar, History, and Geography, methods of Local Administration, Arithmetic, Hygiene, but principally the training comprises instruction in Chemistry, Botany, Zoology, Agriculture, Veterinary Science, Dairy work, Forestry, Gardening, Farm Management, Riding, Surveying, Weighing, Chemical experiments in milk testing (to train milk control officers). In addition, instruction is given jointly wth the High School in singing and gymnastics, daily.

For those who desire to continue practical training in agriculture after having finished their term and passed an examination, it is arranged that they shall receive a position as paid assistant on the farm called Belteberga (Province of Malmo) from 24th April to 24th October, where they will receive further practical instruction in accordance with arrangements made by the College with Mr. Aug. Kimp, the owner of this property, as to the work to be performed. There are one or two travelling scholarships, of 100 kroner each, which will enable recipients to obtain additional instruction or some other instruction and to otherwise increase his knowledge.

In all, not more than 24 students are received in this Branch each term.

From the Royal order issued by H. M. the King, respecting the Agricultural College at Fridham, dated Stockholm Castle, on the 28th February, 1900, the following extract has been made:

Conditions of Entry for Students Who Desire to Enter the Agricultural College.

The following conditions have to be complied with:

(*a*) The student must be 19 years old, of good character, and he must have had at least one year's practical knowledge of the agricultural work, also have a knowledge of the Swedish language and be able to read, and write from dictation without mistakes.

(*b*) Able to write clearly.

(*c*) Firm in Arithmetic, including fractions.

(*d*) He must have an elementary knowledge of Geometry and of surveying.

(*e*) In Natural History, he must have an elementary knowledge of the principle, physical and chemical rules and of the build, etc., of the human body.

(*f*) Bookkeeping, he must have some knowledge of ordinary principles.

3. Such students need not undergo an entrance examination if they have passed through the State-supported High School, or any similar institution which imparts a good knowledge of the Swedish language, mathematics, and natural history, and of the other subjects stated in paragraph 2 of these conditions as required from any student entering the Agricultural College.

The following payments have to be made:

50 kroner as a school fee. This fee will not be charged to students who have passed a satisfactory entrance examination and prove to be of very moderate means.

In the Agricultural College at least three students are exempted from payment of this fee. Students of small means or without means can, in addition, receive a State support of 50 kroner. One or two students may receive from the Agricultural College a travelling scholarship of 100 kroner each, (see above).

A further sum of 50 kroner for each term for apartments. The rooms are furnished with bed and mattress, chest of drawers, table, chairs, lamp, and wardrobe, and are heated, and the price is the same whether a student shares his room with a friend or occupies it alone.

Arrangements must be made with the matron as to payment for cleaning rooms.

The whole cost of meals at the school amounts to 1 kroner per day if contracted for for the whole term. The price of a single dinner is 0.60 kroner. The total cost for single day is 1.25 kroner.

Books and papers can be obtained from local booksellers.

It is advisable to bring bed linen and pillows from home. For students who do not desire to receive board and apartments of the school, the charge for instruction is made similar to above, but no charge would be made for heating, etc.

It is advisable that students live at the school, at all events until accommodation is filled.

Applications are received on the 15th of October at latest.

The conclusion of the term in the High School takes place without examination, but in the Agricultural College there is a public examination.

The students of the High School, who have by good conduct and industry made satisfactory progress in the school, can always rely upon receiving recommendation from the head of the school in the event of seeking employment.

Summer Term.

The Girls' High School and Instruction in Household Affairs, from 1st May Till 31st July.

The aim of the school is the same as stated for the winter term, namely, to be a training college to instruct young people in all branches which are useful, in order to fulfil duties that may later be imposed upon them. The subjects of instruction include those of the winter term, except that they are shorter than those given to the young men.

In the case of Natural Science and Natural History, special care is taken to give instruction in such matters as it is especially important for the head of the household to know. Bookkeeping is also confined to household bookkeeping. Hygiene is taught extensively. There are daily gymnasiums. Sewing instruction includes:

1. Instruction in needlework and mending.
2. All sorts of hemming, sewing, button-making, embroidery, lace making, etc.
3. Weaving and all kinds of old Swedish textile crafts.

As all higher grades of the last mentioned crafts are taught, it is expected that students possess all elementary knowledge of same.

It is not necessary to supply material, cotton, silks, etc., which will be supplied by the school and need not be brought from home. There is no entrance examination. The age of a student must not be less than 16, younger girls are, as a rule, not admitted. The highest age for admission is 20 years.

The household school aims at training students to become careful and sound home managers and is arranged under a system similar to the corresponding winter agricultural school.

Conditions for this branch are that students must be at least 18 years old and also that they must have been employed in housework and passed through the High School.

They must also be able to read well and to write down from dictation without mistakes and they must be able to write short essays, also know elementary arithmetic, fractions and decimals.

In addition, students must also be able to do ordinary needlework.

Instruction in the household school embraces careful teaching in elementary chemistry and natural history, having special regard to all natural forces which have an influence upon the household management.

Instruction in our method of food preparation, composition of meals, etc., home hygiene, instruction respecting furniture and household supplies, gardening and poultry, bookkeeping and expense in housekeeping, arithmetic, singing and daily gymnastics.

The term concludes with a public examination and the issuing of certificates for those students who obtain and apply for same. Free scholarships are given to students with small means.

Support by the State is given to the extent of 200 to 300 kroner per year to students without means.

The fees to be paid by the student amount to 30 kroner and apartments are charged for at the rate of 30 kroner for the term.

The cost of meals per day is the same as in the winter term. As regards linen, etc., the same conditions as above apply.

From 10 to 20 kroner must be paid for material required by students, but any needlework, etc., done by the students remains their property.

Applicants must apply before 15th April. No more than 32 students are received in each term.

Subjects and order of hours are fixed by the headmaster, but in case of students attending a second term they are free to apply for instruction in any subject in which they did not become efficient during the first term.

Written applications must be sent to the headmaster at Svalof in good time and not later than above stated. Enquiries respecting the school are replied to by return of post. Applications are immediately answered as to whether a student can be accepted for the next term or not. It may be pointed out that Svalof is, in many respects, one of our country's most noted places.

PROF. ZAVITZ: Before closing, I wish to say how very much indeed we appreciate the addresses from Prof. James and Mr. Clark. It was not only an inspiration to these gentlemen who had the pleasure of visiting Sweden, but it has been a great inspiration to us to hear them tell of the excellent work conducted in Sweden regarding which we have read in the past. While Prof. James was speaking, I could not help thinking of somewhat similar lines of work which have been carried on in Ontario. Take for instance, the Dawson's Golden Chaff winter wheat that was originated by selection by Robert Dawson at his home about twenty-five miles south of here. In a field of White Clawson wheat, one plant stood up better than all the rest which was badly lodged, and he selected that plant. From that one plant, a new and distinct variety was developed which is now grown very extensively. The Imperial Amber variety of winter wheat was selected in the Province of Ontario and it now stands the highest in yield per acre of all the varieties of red winter wheat which we have under test. These illustrations go to show the opportunity of doing excellent work in the selection of our grains on the farms of Ontario. Then you will remember that the O.A.C. Number 21 Barley, which has given such excellent results over Ontario in the last three years, originated here at the College from one selected plant. We have several other very promising selected strains and new hybrids of our leading classes of farm cereals. I believe the time has come when we can develop more and more this line of work at the College to the great advantage of all concerned. We are greatly indebted to these gentlemen for their very helpful suggestions.

RESOLUTION

The following resolution was presented by Prof. C. A. Zavitz:

I believe it is the consensus of opinion that, owing to the number of meetings that are being held at this time of the year, compelling us to commence our meetings on Monday afternoon at two o'clock, when it is practically impossible for many of the members to be present at the meeting, it would be advisable to change the date of the Annual Meeting of the Experimental Union until some time in January. Perhaps a good time for the meeting would be either at the beginning or at the close of the short courses, when there are not so many meetings or so much going on. Therefore, I move "That in the opinion of the members of the Experimental Union the executive should take into their consideration the advisability of holding the Annual Meeting next year at some other than the usual date, in order to give the members a better opportunity to attend the meeting."

The motion was seconded by J. O. Laird and carried by the meeting.

BINDING SECT. AUG 24 1967